

A STUDY OF THE PATTERN OF NON-EMERGENCY SURGICAL DISEASE  
AMONGST CHILDREN IN LOWER PRIMARY SCHOOL  
IN LUSAKA URBAN

BY

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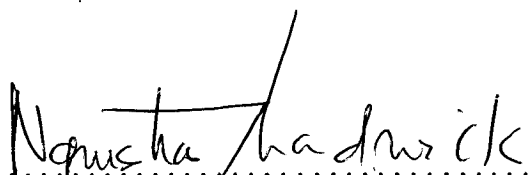
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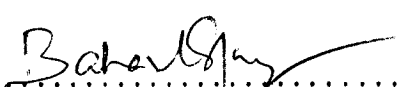
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DECLARATION

I hereby declare that the work presented in this study for the degree of Master of Medicine (M.Med) SURGERY, has not been presented either wholly or in part for any other degree and is not being currently submitted for any other degree.

  
.....  
Dr. Chadwick L.T. Ngwisha

  
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Prof. B. Elem, FRCS  
SUPERVISOR

STATEMENT

I hereby certify that this study is entirely the result of my individual effort. The various personnel to whom I am indebted have been acknowledged in the paper.

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Dr. Chadwick L.T. Ngwisha

APPROVAL

This dissertation of Dr. Chadwick Leonard Thom Ngwisha is approved as fulfilling part of the requirements for the award of the degree of Master of Medicine (Surgery) by the University of Zambia.

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DEDICATION

To my late grandmother ESNART NYAMVULA CHIRWA



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I am grateful to my lecturers without whose advise and counsel in all stages of preparation and arrangement of this dissertation, little could have been achieved.

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Lastly to many others who gave me their criticism, comments and suggestions, I express my sincerest gratitude.

ABSTRACT

This study of the pattern of non-emergency surgical diseases in Zambian school children was undertaken to identify diseases some of which left untreated can pose a problem in later stages of life. If, these diseases are diagnosed then early surgical treatment when indicated would be much better than late. It is, however, interesting to note that the percentage incidence and prevalence of the surgical diseases studied amongst children in Lusaka's Primary Schools has demonstrated some resemblance to those observed in the developed World as published in the literature.

It is further to note that except for two isolated studies documenting a particular type of non-emergency surgical diseases in Zambia (29,32,33) similar studies have not been published. This study therefore enables one to make use of the knowledge obtained and suggest necessary policy for surgical disease management and prevention.

## CHAPTER 1

INTRODUCTION

The establishment of chairs, divisions and departments of pediatric surgery in the university centres attests to an increasing awareness of the special problems in this field. Since our colleagues in many countries are contributing importantly to the growth of pediatric surgical knowledge it is also imperative that we document our experiences in this part of the world.

This dissertation has been embarked upon with a view to determine the prevalence of non-emergency surgical disease in indigenous Zambian Primary School children.

AIM AND OBJECTIVE:

- A. To elucidate the pattern of undetected non-emergency surgical disease in children with the age range 6-15 years.

## TYPES OF SURGICAL DISORDERS INCLUDED IN THIS STUDY:

In this study "patient" is used to refer to a school going child of average age of 6-15 years. Whilst surgical diseases will be defined as Non-emergency surgical disorder will include:

- a) Inguinal hernia
- b) Hydrocele
- c) Phimosis
- d) Meatal stenosis
- e) Umbilical hernia
- f) Undescended testis
- g) Cleft lip and/or palate

Any other surgical abnormality which may be detected during physical examination will also be narrated.

Inguinal hernia was recognised by detecting visible and/or palpable mass in the inguinal and/or scrotal area.

A hydrocele was diagnosed by the presence of fluid in the tunica vaginalis. A congenital type of hydrocele was diagnosed from the history i.e. the child has a flat, flaccid scrotum when he awakens in the morning and during the day the scrotum becomes quite distended with fluid.

At bed-time, the scrotum is large, and once again during the night it becomes smaller as the fluid gradually returns to the peritoneal cavity. Because the connection to the peritoneal cavity is narrow, it is usually possible to get above the smooth cystic swelling. It is understandable that cases of congenital type of hydrocele which is intermittently present could have been missed.

Phimosis was diagnosed by difficulty or inability to retract the foreskin.

Hypospadiasis was detected by detecting the location of the urethral meatus with or without associated chordee.

In the present study the presence or absence of meatal stenosis was determined by inspection alone.

Umbilical hernia was diagnosed by the demonstration of the persistence of a defect in the umbilicus.

Attempt was made to differentiate between undescended and retractile testis and should be able to manipulate a testis in the bottom of the scrotum in the latter situation.

Cleft lip and cleft palate were diagnosed by inspection for a cleft involving the floor of the nostril and lip. This may be on one side or both sides and/or extending through the alveolus, hard palate and entire soft palate.

CHAPTER 2

Review of Literature

Herniorraphy is the operation most frequently performed in infants and children by the general surgeon as is the operation of tonsillectomy in a childrens hospital. When the incidence of inguinal hernia is tabulated by decades, the peak incidence is in the 6th decade of life (5,6,7). In infancy and childhood the peak occurance of hernia is in the 1st year of life, and it is more common in the first six months than in the second (8) (i.e. 38% within the first 6 months of life and 49% in the 1st year). The actual herniation of bowel into a patent processus vaginalis developes in 1-4 percent of children (39,40). In all age groups hernia occurs more frequently in males than in females. In the younger infant however the incidence of hernia in females is higher than in the older group (8).

Ten percent of infants and children who have a clinically evident inguinal hernia on the opposite side (9), and probably both hernias should preferably be repaired at the same operation. If an infant or child presents with a unilateral hernia, there exists a continuing dilemma as to whether the opposite inguinal should be explored surgically in anticipation of finding an inguinal hernal or a patent processus vaginalis, or simply to prove there is no hernia. It is in patient's best interest if, by exploration of the opposite inguinal canal, a hernia can be corrected or prevented.

If, on the other hand, the added risk results in an anaesthetic complication, a wound complication or injury to the vas deferens or spermatic vessels, exploration is clearly not in the patient's best interest (9). The younger the patient, the higher the incidence of "positive" contralateral finding: either a hernia or a patent; processus vaginalis (10,11,12). Bilateral hernias are more common in females in premature infants and when the presenting hernia is on the left side. These facts, however, do not solve the practical dilemma as to whether or not bilateral exploration is justified when there is a unilaterally overt hernia. After considering all the varied statistics, a policy by Wooley et al (13) to recommend bilateral exploration in boys up to 2 years of age and in girls up to 6 years of age may prove useful.

The frequency of undescended testis is higher in the prematurely born infant than in the term infant. The majority of undescended testis in infants descend by the end of the first year. For these individuals, this sequence appears to be a normal variant. Unless there is an associated trouble some hernia, no therapy is required or desirable during the first 1-2 years of life. In the series reported by Benson and Lofti (14), the incidence of non descent in the prematurely born infant averaged 26.5% and in the full term infant 3.2%. At the end of the 1st year of life approximately 5.4% of premature infants and 0.5% of full-term infants will have undescended testis (43). Extensive statistics derived from a total of over 12 million American and European military recruits reveals an average incidence of 0.28% undescended testis (15,42,44).



Approximately one half of undescended testes will be on the right 25% on the left and 25% bilateral (16,17,18,19,20,21). It is of more than cursory interest that the right testis descends later than the left, right inguinal hernia are more common than left and the right testis is more apt to be involved by malignancy than the left.

Sorensen (16) estimated that hypospadias occurs once every 300 live births and that approximately 7000 new patients appear annually in the United States. Avellan (17) determined the incidence of hypospadias in Sweden from 1965 to 1968: 666 patients were identified among 480,000 live births, an incidence of 13.9/10,000 births. The report is an oddity in that separate figures for male and female live births are not given. Assuming they were equal, 2.8 male cases per 1000 provide an incident of 1 in 300.

It is impossible to estimate the ratio of male to female involvement since it is by and large assumed that in many females the diagnosis is not made by the clinician. The commonest presenting problem in the female is the inability to void in the neonatal period because of stenosis of the external urethra meatus, abnormally placed at some point on the anterior wall of the vagina. Other patients do however present later because of urinary incontinence (38).

Espispadiasis is often in males but far more rarer than hypospadiasis, being a congenital anomaly of the urethra and bladder neck related to the bladder exstrophy occurring once in 30,000 deliveries. Female espispadias is significant only because of the frequently associated incontinence.

In 1940, Dees (19) collected 45 cases of male and 11 of female epispadias including the 13 cases reported by Young in 1937. He added three cases of his own and made a strong pleas for definitive repair rather than ureteral transplantation. In Campbell series, (20) there were 8 males and 7 females, all of the later incontinent. Gross and Cresson (21) reported on 15 males and 3 females. Burkholder and Williams (22) treated 17 boys and 10 girls all incontinents and Gibert and Cibert (23) reported on 7 incontinent girls. Thus in the total collected series there were 72% males and 28% females.

A meatal stenosis may arise as a result of previous instrumentation or catheterisation or in association with diseases such as balanitis xerotica obliterans. The role of infection is difficult to define but certainly a meatal stenosis can occur with a phimosis in children who have had recurrent episodes of balanitis. In addition the correction of hypospadiac malformations would also require the construction of a terminal meatus (38). However, superficial meatal ulceration is not uncommon in little boys who are still in diapers and have been circumcised, frequently being associated with ammonical dematitis of the scrotum, perineum and thighs. This will present later with difficulty in micturation, dysuria and occasionally heamaturia.

Umbilical hernia is seen in many animals species as well as in man. There is a high familial incidence, but no genetic pattern of inheritance has been identified.

The frequency of congenital umbilical hernia is about 6-10 times higher in blacks than whites, with the reported incidence in the former (21), ranging from 25 to 50% in the early months of life (4,24). The incidence is increased in a number of congenital malformations, including thyroid dysgenesis, trisomy 18, trisomy 13, Beckwith's syndrome and Huler's syndrome. The literature abounds with conflicting views of natural history of umbilical hernia. It is possible that all congenital umbilical hernia might close spontaneously given sufficient time. Spontaneous closure is related to the diameter of the ring, almost all those under 0.5cm closing by age of 3 months (25,46).

Laaletta et al (26) concluded in his works that surgery should not be considered before the age of 2-3 years, by which time most umbilical hernias would have closed spontaneously. However, surgical repair is indicated when the fascial defect is greater than 1cm, in girls over 2 years of age, and in all children over 4 years of age (45). But there is said to be a higher rate of recurrence after operations in infancy.

Numerous studies have confirmed the natural trend of decreasing incidence of phimosis. But none has received wider publicity than that of Gaidner(27) whose important paper has modified the practice in Britain. He demonstrated that while 90% of boys have unretractile foreskin at birth by the age of 3 years the proportion would have dropped to only 10%.

## CHAPTER 3

METHODOLOGY AND MATERIALSBackground

Consent to carry out the study was initially obtained from the Ministry of Education and subsequently from the Headmaster of the school concerned. Primary School children in Lusaka Urban made up the study population. Two of these schools were then chosen in this study group so as to reflect the pattern of surgical disease in children in grade 1 - 3. The pupils age was determined by direct questioning of the pupil as to the year of birth and then counter checked with the school register. Woodlands "B" Primary School located in a low density area of Lusaka was selected as one of the schools whilst Kizito Primary School located between Matero and Garden Compounds was chosen as representative of high density area.

In these schools all children in grade 1-3 were included in the study and were questioned as to their date of birth and then subjected to a physical examination with emphasis on surgical disease.

A total of 943 pupils (445 from Woodlands "B" and 468 from Kizito) were included in the study. The results were subsequently subjected to statistical analysis.

Research Design

This research is one point prevalence of surgical disease in children in Lusaka Urban primary schools.

### Data Collection

All the patients were interviewed by the principal investigator and consent obtained from the Headmaster of each school for and on behalf of each pupil. Subsequently leading questions in the history were asked regarding the date of birth and then the patient was physically examined.

### Data Analysis

The data has been analysed using two by two tables and then determining the Chi Square. Stratified analysis to determine the relative risk of surgical disease using the Greenland, Robins 95% confidence limits (3) and subsequent correction of the Chi Square and P-values with the Mantel-Haenzel and Yates tables, Fischer exact 1 and 2 tailed P-values are also used to further test the significance and bias of the results.

## CHAPTER 4

Results

A total of 943 indigenous Zambian pupils were included in the study group. There were 493 (52.3%) girls and 450 (47.7%) boys. (Table 1). Their age varied from 6 up to 15 years (mean age 8.65 standard deviation 1.25), but 91.8% were below 10 years (Table 2).

A total of 129 (13.6%) of umbilical hernia was found which were composed of 77 (57%) male and 52 (43%) female. Statistical analysis revealed a Chi Square of 19.04 and a P-value 0.00026813 hence making this a significant finding. The commonest size of umbilical hernia was less than 5mm (Table 6), followed by that of 5-10mm and more than 10mm (Table 5,7 respectively). Neither sex nor age, showed a significant relationship as to the presence or absence of umbilical hernia (P-value 0.6549 Table 8).

Right sided inguinal hernia was found in 3 (0.32%) male patients of ages 6,9 and 10 years. No cases of associated hydrocele and or retractile testis were found.

Three male pupils were noted to have had circumcision, however, the indication for surgery could not be established. It is interesting perhaps to note that no case of phimosis was detected.

No patient with either cleft lip and/or palate and meatal stenosis were seen.

Dental caries was also seen as a coincidental finding in 124 (13.1%) pupils with an almost equal frequency in both male and female giving a relative risk of 1.01 (Table 12).

A total of 20 (2.1%) pupils had tonsillar enlargement whilst 2 (0.2%) had cervical lymphadenopathy.

Two male pupils of ages 9 and 11 years were known cases of sickle cell anaemia.

Post polio-paralysis of the right lower limb was also found in one female pupil of 9 years of age; the diagnosis of polio was entertained on the basis of clinical history.

## DISCUSSION AND CONCLUSION

### Discussion

A total of 943 indigenous Zambian pupils were entered into this study from the study population of primary school children in Lusaka Urban. Since the birth dates given at the time of registration usually relate to the required age of a child to start school and not necessarily the actual age (35), it is for this reason all the children in Grade 1-3 have been included in the study regardless of age.

Two schools were selected randomly so as to reflect the possible true prevalence (i.e. taking into consideration the varying social economic status hence leading to varying population densities in the city's suburbs) of non-emergency surgical disease.

Contrary to the wide prevalence of inguinal hernia and/or associated hydrocele seen in most paediatric surgical centre (39,40,41). The absence of any case of hydrocele and undescended testis reflected a rather small study population. In this study 3 (0.6%) male pupils had right sided inguinal hernia. No cases of hydrocele and undescended testis were seen probably suggestive of rarity of the condition. For several reasons the prevalence of abdominal hernias is difficult to estimate. If a hernia is small, it may not be readily detected on any one examination. If findings from anatomic dissections are used, the incidence will be higher than if the figures are drawn from routine physical examination. In certain border line lesions, not all physicians will agree as to whether or not a hernia is present



For instance some paediatric surgeons apparently equate a patent processus vaginalis at surgery with the evidence of an indirect hernia, but most surgeons and anatomists do not accept this proposition without qualification. However, it is generally agreed that the common hernia in either sex is the indirect variety. Direct hernia's are most unusual in females, however, femoral hernias as a class are more common in female than males, but hernias in general are over five times more common in males. Summarizing available evidence, Zimmerman and Anson (34) in their monograph on hernias conclude that the frequency of can be placed at 5% of the total male adult population. In this study of the pattern of surgical disease a frequency of 0.6% is comparatively low to Zimmerman and Anson (34). But our study population was limited by to the average age of 8.89 years and it is conceivable that some of these children would have developed an acquired inguinal hernia when adults. However, as he rightly points out only if you confirm your clinical diagnosis with your operative findings can you know the the prevalence of the disease.

Past circumcision was seen in three male patients ( P value 0.1004) however the indication for surgery could not be established. It is conceivable that phimosis could have been the indication for the surgery, and not ritual since this type of circumcision is normally performed near pubertal age. This practice is not common in the population in Lusaka at large, hence it may account for low frequency of cases found. In a Danish (28) study, 9,000 school pupils were examined and phimosis was found in 8% of the 5 year olds but in only 1% of secondary school pupils.

In a further study amongst 152 teenage pupils only one(0.33%) had a non retractile foreskin which would require circumcision though full retraction was prevented by an adherant prepuce in 22 (14.5%). In the Zambian primary school study the fact that only 3 (0.33%) pupils were noted to have undergone previous circumcision, is very encouraging since there is always a danger of being over zealous with diagnosing phimosis which more often than not leads to surgery. Though we do carry out a lot of circumcisions for diagnosis stated as phimosis at University Teaching Hospital, Lusaka, it may now be imperative to review our policy and perhaps advocate delayed circumcision on these patients if at all. Examiantion of the penis, as well as the testis should therefore be a standard part of school medical inspections. This would allow the few boys with phimosis to be treated early, and at secondary school would provide an excellent opportunity to back up or amplify parental instructions in personel hygiene.

Umbilical hernia was the commonest surgical disease found in 129 (13.6%) pupils giving a Chi-square of 19.04 and P value 0.00026 and a pattern decreasing hernia size and prevalance with age agrees with that found by Lasaletta et al (26). However there was no significant difference between males and females (Chi-square 6.83, P value 0.6549). It is possible that all congenital umbilical hernia might close spontaneously given sufficient time. Spontaneous closure is related to the diameter of the ring almost all those under 0.5cm closing by age of 3 months (25).

However in this study it is likely that an umbilical hernia less than 0.5cm present at 8 years is because the hernia at birth was larger and diminished in size with growth to less than 0.5cm by year 8.

This is the second time that the frequency of Umbilical hernia in Zambian School children has been documented. The first study of 1981 by Rao and Katzarski (29) showed a frequency of 6.7% in the 5-18 year age group. The male to female ratio was 5.6:7.8 percent showing a preponderance in females but the opposite was found in the present study (M:F = 17.1:10.5 percent). This difference is difficult to explain since the male to female ratio in both studies was almost the same though Rao and Katzarski had a wider age range and study group.

Studies done by Crump (2) do however confirm that Negro's do have a relatively high frequency of 24.7 percent of umbilical hernia. However, the study by Mack (36) reaffirms that a frequency of 13.6% may be true for indigenous Zambian children, since he had demonstrated that the incidence of umbilical hernia was 60% during the first year of life and gradually decreasing to 7% by the fifteenth year.

This is the third time in Zambia that data on dental caries has been presented. The first was by Ukeje (32) in 1971 and then Baboo et al (33) in 1981. In both their work it was concluded that Urban population have a higher incidence of dental caries rate than the rural one. This may be attributed to the effects of urbanization, such as the readily availability of refined carbohydrates replacement of the traditional "chewing stick" by the inferior quality tooth-brushes, ignorance of dental hygiene.

In this study 124 pupils (13.1%) had dental caries; (79) 56.4% from Woodlands "B" and (54) 43.6% from Kizito Primary Schools. However this difference in distribution is statistically insignificant (Chi-square 9.27 P-value 0.412). The relative risk between male and female was almost equal (R.R 1.01 P-value 0.9734).

However it was evident that caries was higher in lower age groups (Table 9). The role of refined carbohydrates may be of major significance and its easy availability in large amounts in the city may be the reason for much higher caries is a major health problem (32,33).

Health education directed at highlighting the disadvantages of refined carbohydrates and proper dental hygiene will go a long way in solving the problem. Hence the need for it to receive its proper place in National Health Planning.

### CONCLUSION

Of the 7 disease process looked for in this study only umbilical hernia and inguinal hernia were noted to be present. The pupils who had previous circumcision could have been due to phimosis. It is extremely difficult to explain the total absence of even a single case of undescended testis. The absence of any case of cleft lip and/or palate could have been explained by the fact that patient's with this deformity is denied admission to the school until surgical correction has been accomplished. Alternatively the parents may hide away or even deny the child school admission since his or her appearance may embarrass them. The incidental findings of caries confirms its high prevalence in Zambian School Children whilst the aetiology of cervical lymphadenopathy remains obscure. The above findings should prove beneficial in the understanding of the prevalence of non-emergency surgical diseases in the lower primary school children which if remains uncorrected may cause considerable morbidity at a later date.

Table 1: SEX DISTRIBUTION

SEX	FREQUENCY	PERCENTAGE	CUMULATIVE FREQUENCY
Female	493	52.3%	52.3%
Male	450	47.7%	100.0%
TOTAL	943	100.0%	-

Table2: SEX DISTRIBUTION

AGE IN YEARS	FREQUENCY	PERCENTAGE	CUMULATIVE FREQUENCY
6	12	1.3%	1.3%
7	75	8.0%	9.2%
8	281	29.8%	39.0%
9	342	36.3%	75.3%
10	156	16.5%	91.8%
11	37	3.9%	95.8%
12	30	3.2%	98.9%
13	6	0.6%	99.6%
14	2	0.2%	99.8%
15	2	0.2%	100.0%

sum: 8386

mean: 8.89

s.d: 1.25

Table 3: INGUINAL HERNIA DISTRIBUTION

INGUINAL HERNIAL	FREQUENCY	PERCENTAGE	CUMULATIVE FREQUENCY
None	939	99.8%	99.8%
Right	2	0.2%	100.0%
TOTAL	941	100.0%	-

Table 4: UMBILICAL HERNIA 0 &lt;5mm

AGE IN YEARS	FEMALE	MALE	TOTAL
6	0	3	3
7	2	3	5
8	7	18	25
9	7	18	25
10	3	9	12
11	1	1	2
12	0	0	0
13	0	0	0
14	0	0	0
15	0	0	0
TOTAL	20	52	72

Table 5:

## UMBILICAL HERNIA 5&lt;10mm

## MSEX

AGE IN YEARS	FEMALE	MALE	TOTAL
6	0	0	0
7	1	1	2
8	9	4	13
9	3	5	8
10	2	4	6
11	0	0	0
12	0	0	0
13	1	0	1
TOTAL	16	14	30



Table 6: UMBILICAL HERNIA 0 10mm

AGE IN YEARS	FEMALE	MALE	TOTAL
6	0	0	0
7	2	1	3
8	4	4	8
9	8	3	11
10	2	3	5
11	0	0	0
12	0	0	0
13	0	0	0
14	0	0	0
15	0	0	0
TOTAL	16	11	22

Table 7: DENTAL CARIES

AGE IN YEARS	PRESENT	ABSCENT	TOTAL
6	1	11	12
7	8	67	75
8	26	255	281
9	64	278	342
10	20	136	156
11	3	34	37
12	1	29	30
13	1	5	6
14	0	2	2
15	0	2	2
TOTAL	124	819	943

An expected value is <5. Chi square not valid

Chi square = 17.70

Degree of Freedom = 9

Table 8: FREQUENCY OF DENTAL CARIES

DENTAL CARI	FREQUENCY	PERCENT	CUMULATIVE
Present	124	13.1%	13.1%
Abscent	819	86.9%	100.0%
TOTAL	943	100.0%	

Table 9: MALE TO FEMALE RATIO OF DENTAL CARIES

SEX	PRESENT	ABSCENT	TOTAL
Female	65	428	493
Male	59	391	450
TOTAL	124	819	943

QUESTIONNAIRE

## NON-EMERGENCY SURGICAL DISEASES IN CHILDREN STUDY

## 1. PERSONAL CHARACTERISTICS

NAME:..... DATE OF BIRTH:.....

SEX: .....

## 2. CLINICAL PRESENTATION

- |     |                    |        |                                       |
|-----|--------------------|--------|---------------------------------------|
| (a) | HERNIA             | YES/NO | RIGHT/LEFT/BOTH                       |
| (b) | HYDROCELE          | YES/NO | RIGHT/LEFT/BOTH                       |
| (c) | PHIMOSIS           | YES/NO |                                       |
| (d) | CIRCUMCISION       | YES/NO | ELECTIVE YES/NO<br>TRADITIONAL YES/NO |
| (e) | MEATAL STERNOSIS   | YES/NO |                                       |
| (f) | UMBILICAL HERNIA   | YES/NO |                                       |
| (g) | i. CLEFT PALATE    | YES/NO |                                       |
|     | ii. CLEFT LIP      | YES/NO |                                       |
| (h) | UNDESCENDED TESTIS |        |                                       |
|     | i. RETRACTILE      | YES/NO | RIGHT/LEFT/BILATERAL                  |
|     | ii. MALDESCENT     | YES/NO | RIGHT/LEFT/BILATERAL                  |

	RIGHT	LEFT	BILATERAL
ABDOMINAL			
INTERNAL RING			
EXTERNAL RING			
INGUINAL			
NECK OF SCROTUM			

- ECTOPIC:    A.    SUPERFICIAL INGUINAL PONCH  
               B.    PREPENILE  
               C.    PERINEUM  
               D.    THIGH ADJACENT TO SCROTUM  
               E.    OPPOSITE SCROTUM

(I)            PRESENCE OF DENTAL CARIES: YES/NO

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