



NIGERIAN MEDICAL ASSOCIATION ANAMBRA STATE CHAPTER



MEMORIAL LECTURE OF

**EMERITUS PROFESSOR
FESTUS AGHAGBO NWAKO**

TOPIC:

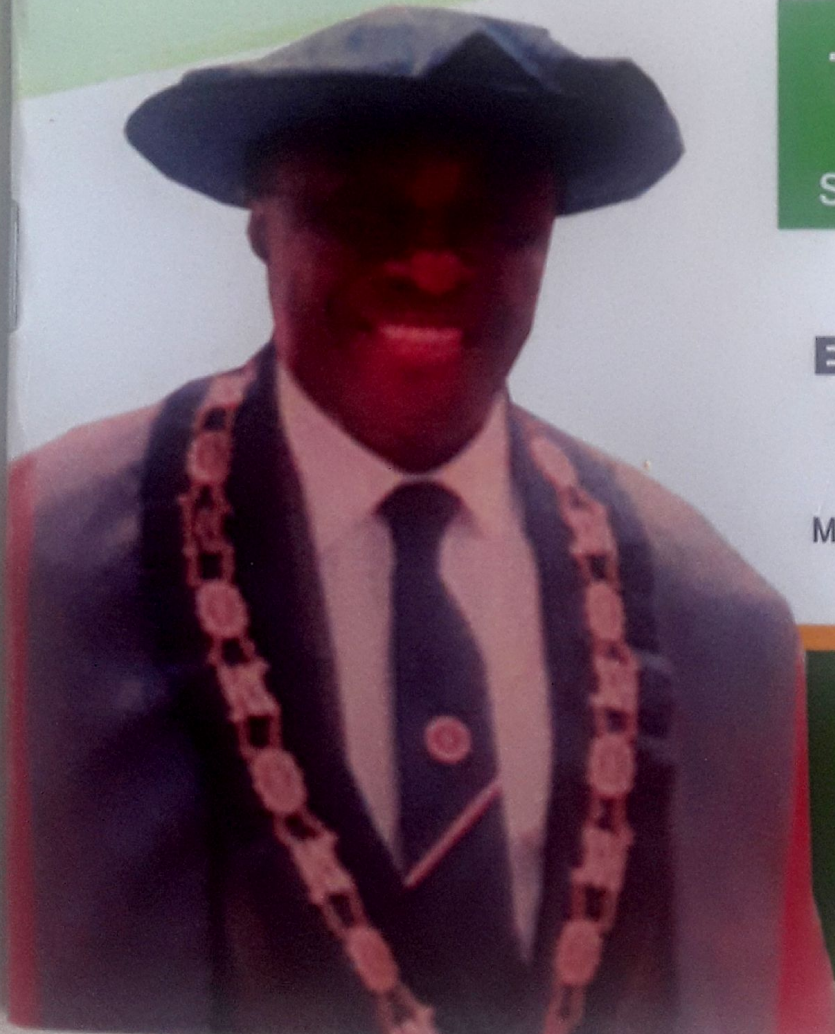
**THE UMBILICUS:
THE PAEDIATRIC
SURGEON'S PERSPECTIVE**

BY

**EMERITUS PROFESSOR
NENE ELSIE NWADA
AGUGUA-OBANYO**

MBChB (B'ham); FRCS (Eng); FMCS (Nig);
FWACS; FICS

DATE: 23rd July, 2022
VENUE: NMA House,
Chukwuemeka Odumegwu Ojukwu
University Teaching Hospital,
(COOUTH), Awka
TIME: 10.00am





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The Umbilicus: The Paediatric Surgeon's Perspective

The 4th Memorial Lecture for
Emeritus Professor Festus Aghagbo Nwako

By

Emeritus Professor Nene Agugua-Obianyo

I am immensely delighted to participate in giving honour to Emeritus Professor F.A. Nwako. I regret that efforts to bring me to this forum earlier were not successful. I apologise to the Nigerian Medical Association Anambra State Chapter. It's really better late than never as I continue to appreciate the effort Prof Nwako made to train me to this standard of Paediatric Surgery.

When I commenced work at UNTH Enugu, I was posted to the Department of Surgery as a Senior Registrar. Prof Nwako was then the head of the Department of Surgery, and I was the only Senior Registrar in the department. On that first day, I walked into his paediatric surgical clinic and introduced myself. He was seeing a child with neurofibromatosis. He immediately drilled me with questions on the clinicals and pathology of the subject; and then confidently walked away saying "You should take over this clinic while I do some work in the department". I had come back from England as a trained General Surgeon.

Few weeks later, one other Senior Registrar joined the surgery department. Prof instructed that I stayed in Paediatric Surgery while the other Senior Registrar who also trained as a General Surgeon remained in General Surgery. This was the beginning of my subspecialty training in Paediatric Surgery. It was not by choice but by instruction; and till date I remain very grateful to

Prof Nwako for that.

In 1982, I went back to England to study Paediatric Surgery. There, they were amazed at how much knowledge and skills in Paediatric Surgery I had already acquired. I had to explain to them that I had been under the tutelage of an educational and surgical guru, a teacher per excellence.

While walking in Prof Nwako's unit as a senior registrar, a consultant, and a professor, I learnt from him not only how to operate on children, but also how to teach others. His ward-rounds, tutorials, and lectures were punctuated by such jokes that made the message indelible in the minds of the trainees. Prof was committed to imparting knowledge to his trainees. I found his style of teaching incredibly rewarding.

My choice for the topic of this memorial lecture is “**The Umbilicus: The Paediatric Surgeon's Perspective**”

The **umbilicus**, popularly known as the **belly button** or the **navel**, occupies a strategic position on the abdomen of human beings. In adults, particularly ladies, it is a central focus of attraction. In some cultures, they wear a ring on the umbilicus to enhance its beauty; some have tattoo in and around the umbilicus. In children, the umbilicus may not signify beauty nor attraction, but it is very important in the memory of even the toddlers. My aim of this lecture is to draw attention of doctors and parents to the significance of the umbilicus to the child and to discourage doctors from excising the umbilicus without planning its reconstruction. By children I refer to kids who are not able to represent nor defend themselves. The umbilicus is significant in the foetus, the infant, and the older child.



The Maternal-Foetal Umbilical Connection

The foetus (the unborn baby) lives in the uterus (the womb) for nine months, where it is connected to the mother via the umbilical stalk. (Fig.1) The foetal umbilicus appears at the fourth week of gestation when the folding of the embryonic plate occurs. This primitive umbilicus connects the baby with the mother as the umbilical stalk, and it contains the umbilical vessels, vitelline duct and vessels, and the allantois. Through this connection the baby in the womb has access to the mother's digestive, urinary, and cardiovascular systems. When later changes occur, the definitive umbilical cord is formed which contains three umbilical vessels (one vein and two arteries). After birth, the umbilical vessels obliterate and form ligaments.

In other words, through this umbilical connection, the unborn baby receives **life** from the mother. It may be a myth but through this umbilical cord the unborn baby communicates with the mother. They discuss "in the language they understand" We have evidence that the unborn baby moves in the womb on occasions and the mother feels and appreciates it. Moreover, on coming out of this cosy uterine environment after nine months, the baby weeps and yells as the duty nurse cuts the umbilical connection. What a mental agony! Why does the baby cry and weep as it exits from the womb? There are both physiological and psychological explanations. Crying is a sign of unhappiness. It's obvious the baby didn't want to come out. Why?

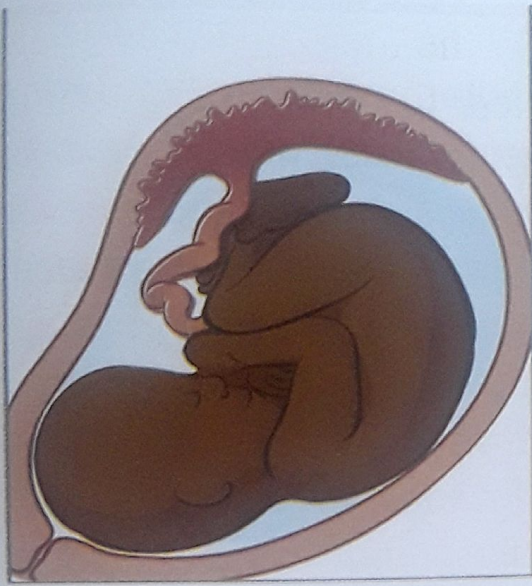


Fig.1: The Umbilical Connection between Mother and Foetus.

In the postnatal child (after birth), the umbilicus remains a vestigial scar left behind after the cut umbilical cord has healed. It occupies a central and constant position on the anterior abdominal wall. We've found that children are very conscious of this umbilicus and most times they fiddle with it and commonly use it as 'a pointing sign'

Is this consciousness of the umbilicus reminiscent of the intrauterine maternal connection? Is it physiological or psychological? I believe it's both.

The Umbilical Pointing Sign

Most times, when a child is sick and you ask him where the problem is or where it is paining him, he will point to the umbilicus irrespective of the clinical condition. We refer to this as "the umbilical pointing sign". This sign has led clinicians to make wrong diagnosis and even wrong operation. Let me use specific cases as examples.

Case 1: A 5-year-old girl (Fig.2) had a history of intermittent abdominal pain with occasional vomiting. She was taken to a hospital and the only positive finding was the umbilical pointing sign. She was treated for peptic ulcer disease. There was no improvement and she continued to point to her umbilicus. Her appendix was surgically removed; but her symptoms continued. An umbilical herniorrhaphy was done; her problem persisted. She then had an upper GI barium study done in a third hospital and malrotation was diagnosed. Surgery number three led to the relief of her symptoms.

Case 2: A 3-year-old boy whose clinical features were intermittent vomiting, vague abdominal pain and the umbilical pointing sign, had treatment for malaria and typhoid. His symptoms persisted. He then had surgeries for umbilical hernia, and appendicitis with no remedy. Finally, he had an upper GI series and a 4th diagnosis of malrotation was made followed by a 3rd surgery which led to the relief of his symptoms.

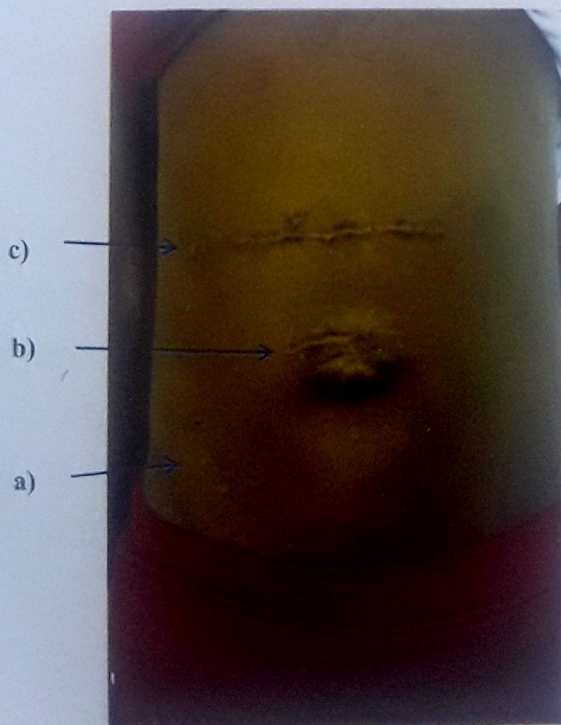


Fig.2: A case of malrotation
The "Umbilical Pointing Sign"
led to 3 different surgical scars:-
a) appendicectomy scar
b) umbilical herniorrhaphy scar and
c) laparotomy scar for malrotation
surgery

The Umbilicus and Malrotation Syndrome

During normal abdominal development, the 3 divisions of the GI tract (ie, foregut, midgut, hindgut) herniate through the umbilical defect out from the abdominal cavity. They undergo a 270° counterclockwise rotation around the superior mesenteric vessels. Following this rotation, the bowels return through the umbilical defect into the abdominal cavity. Finally, there's fixation of the duodenojejunal loop to the left of the midline, and the cecum in the right lower quadrant of the abdomen. Malrotation syndrome refers to any abnormal variation in rotation, migration, and fixation of the intestine during development. This abnormal variation can occur at a wide range of locations. This leads to the various presentations of malrotation syndrome, namely: -

- Acute or chronic intestinal obstruction (e.g. congenital bands)
- Acute or chronic volvulus (e.g. volvulus neonatorum)
- Internal hernias (e.g. mesocolic hernia)

In the presentation of malrotation, the symptoms are usually vague and non-specific, and clinicians are advised on a holistic examination and thorough investigation before embarking on surgery. **An awareness that the “umbilical pointing sign” in children may not necessarily relate to the umbilical area is important.** Researchers suggest that about 40% of patients with malrotation present within the first week of life, 50% in the first month, and 75% in the first year. However, more recent series have shown that malrotation is increasingly identified in older children. About 31% are diagnosed between 1-18 years of age. A high index of suspicion is mandatory.

The Umbilicus and Appendicitis

Typically, when the appendix is inflamed, a periumbilical pain is perceived. This may be why the umbilical pointing sign in children misleads clinicians to the diagnosis of appendicitis. But this is not the only presentation of appendicitis. Appendicitis also produces pain and tenderness in the right iliac fossa in addition to other clinical features. Bearing in mind that children are preoccupied with their umbilicus, when a child presents with the umbilical pointing sign, every effort should be made to evaluate the child holistically before embarking on appendicectomy.

The Umbilicus and Umbilical Hernia

The umbilical ring is a fascial defect in the linea alba. It closes gradually and progressively through the extra-uterine life. Most Africans have umbilical hernia in childhood but this regresses and closes as they grow older. Umbilical hernia with a wide defect ($>2\text{cm}$) commonly does not cause pain or illness. If the defect is smaller, it is more likely to be obstructive. When the child is fiddling with his umbilicus or when he is using it as a pointing sign, the clinician should investigate thoroughly before embarking on a herniorrhaphy. More importantly, umbilical hernia repair should not sacrifice the belly button. The incision for uncomplicated umbilical hernia surgery is a curved infraumbilical incision close to the umbilicus (Fig.3).



Fig.3: Preservation of the Umbilicus in Herniorrhaphy.

The Umbilicus and Congenital Disorders of the Anterior Abdominal Wall

There are a number of congenital disorders (birth defects) involving the anterior abdominal wall and the umbilicus. These birth defects or their surgical correction commonly destroys the umbilicus. I shall pick on some common ones to illustrate the need to reconstruct the umbilicus in a child.

Omphalocele

Omphalocele is a congenital anterior abdominal wall defect involving the umbilicus. At birth it presents as a defect in the umbilical ring with the protrusion of internal organs to the exterior (Fig.4). The exteriorised organs are commonly covered by the omphalocele membrane which consists of peritoneum on the inside, amnion on the outside and Wharton's jelly in between. The defect will require closure either non-operatively or by surgery. In either case the umbilicus is abnormal or non-existent. Upon repair of the omphalocele, the surgeon must complete its task by re-fashioning an umbilical cicatrix for the child. An umbilicoplasty (reconstruction of the umbilicus) is mandatory for the child to feel normal while growing up. It may be done at a different sitting from the surgery for the omphalocele.



Fig.4: Omphalocele

Gastroschisis

Gastroschisis is another birth defect involving the anterior abdominal wall. It is a full thickness defect just lateral to the umbilicus. Through the defect, internal abdominal organs eviscerate (Fig. 5). In this condition they are not covered by any membrane and an emergency surgery is indicated at birth to 'house' or cover the organs. In so doing the natural umbilicus may be destroyed. Again, the onus is on the surgeon to re-establish an umbilical cicatrix for the infant by way of umbilicoplasty i.e. reconstruction of the umbilicus.



Fig.5: Gastroschisis

Umbilical Granuloma /Polyp /Fistula /Sinus

After ligation/excision of the umbilical cord at birth, the umbilicus takes about seven days on the average to heal, leaving behind a thick scar – the umbilical cicatrix. On occasions, the severed umbilical stump refuses to heal and leaves behind an umbilical granuloma (Fig.6), umbilical polyp or umbilical fistula/sinus. There may be discharge of mucus, faeces, or urine

from the umbilical stump. This calls for investigation of associated congenital anomalies of the umbilicus which includes the following: -

- *Persistent Vitello-Intestinal Duct*: Faeculent material is discharged through the umbilicus as there is an abnormal fistulous connection between the intestine and the umbilicus. This anomaly does not allow the umbilicus to heal.

- *Patent Urachus*: Urine is discharged through the umbilicus indicating the persistence of the urachus which connects the urinary bladder to the umbilicus.

- *Umbilical Sepsis* prolonged and severe may cause umbilical granuloma.

Surgical treatment of these anomalies should leave the umbilicus as normal as possible.



Fig. 6: Umbilical Granuloma

Surgery for Epigastric Hernias & Preservation of the Umbilicus

Epigastric hernias in children are very painful. Small loops of viscera or bowel are pinged in between the interdigitating fibres of the linear alba of the anterior abdominal wall. They loop in and out, and the pain comes in intermittent spasms. The umbilical pointing sign appears real. Epigastric hernia may coexist with umbilical hernia. In this case, most Paediatric Surgeons will use upper midline longitudinal incision to close both the epigastric and umbilical defects (Fig.7a) and clearly preserve the umbilical cicatrix (Fig.7b).

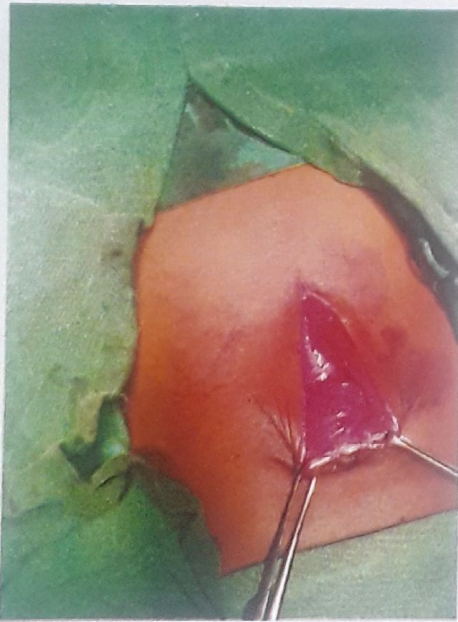


Fig.7a: Epigastric Hernia Repair



Fig.7b: Preservation of the Umbilicus

Umbilical Teratoma: Reconstruction of the umbilicus

A 2yr old boy, was born with a congenital umbilical teratoma. Though the cosmetic appearance was bad, the parents were not bothered until the boy became aware that his umbilicus was different from that of his twin brother and others at the nursery school. He was psychologically disturbed. He developed an additional symptomatic umbilical hernia by the age of 2yrs

(Fig.8a) He had a combined surgery of excision of the umbilical teratoma, repair of the umbilical hernia, and reconstruction of the umbilicus (umbilicoplasty) (Fig.8b)

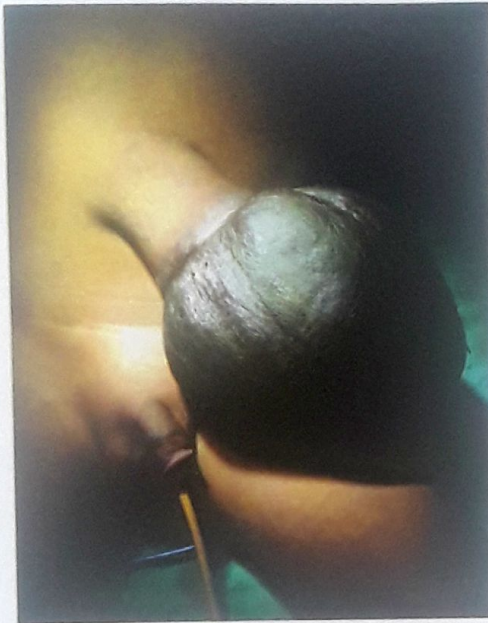


Fig.8a: Umbilical Teratoma & Hernia



Fig.8b: Umbilicoplasty, post-op

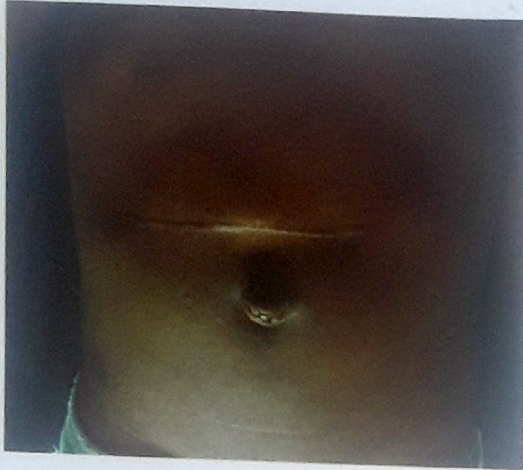
Preservation of the Umbilicus in Abdominal Incisions

Because of the significance of the umbilicus to the child, we consider it ethical to preserve it, or reconstruct it, in any abdominal surgery. We recommend that routine abdominal incisions for any surgery should **not** be made through the umbilicus. (The emphasis is on routine incisions). When midline longitudinal incision is used for epigastric hernia, the umbilicus is spared. if there is a need to sacrifice the belly button in any operation, a follow-up umbilicoplasty is indicated.

Abdominal incisions commonly used by Paediatric Surgeons are mostly transverse (not longitudinal), examples: -

- Transverse Supraumbilical Incision (Left, Mid, & Right)
- Transverse Infraumbilical Incision (Left, Mid, & Right)
- Transverse Pelvic Skin Crease Incision (Left, Mid, & Right)

- Subcostal Incision (Right & Left)
- Appendicectomy: Right Transverse incision at McBurney's point
- Umbilical Herniorrhaphy: infraumbilical curvilinear incision



**Fig.9: Transverse
Supraumbilical Scar**



**Fig.10: Poor Surgical Scar
with loss of the Umbilicus.
Umbilicoplasty is indicated**

Reconstruction of the Umbilicus - Umbilicoplasty

Umbilicoplasty is an important surgical reconstruction to give the abdomen its natural appearance. The umbilicus is a mirror of the abdomen in children.

Umbilicoplasty is indicated following loss or damage of the umbilicus by trauma, congenital malformation, or surgical excision.

About 66 methods of umbilicoplasty have been developed mostly in adults. At the same time, many names have been given to the reconstructions. There's no universal technique of reconstruction. The choice of technique for umbilicoplasty depends on the surgeon's experience, and the abdominal problem being corrected.

My technique of choice in children is the **purse-string umbilicoplasty**. After closing the peritoneal cavity properly, a number of circumferential gathering sutures around the edge of the central abdominal defect are inserted; first at the base, then two or more similar sutures above the first. These purse string sutures are then tied constricting the lumen (Figs.11). Healing leaves a nice umbilical cicatrix.

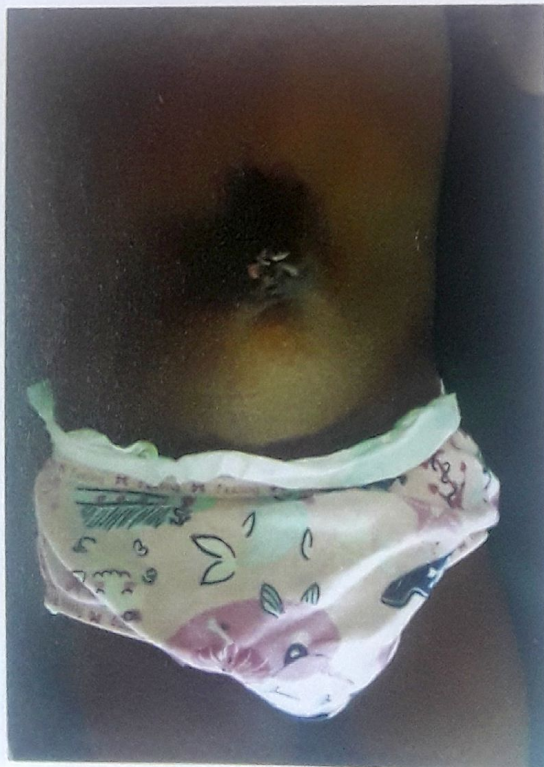


Fig.11: Umbilicoplasty. Reconstruction of the Umbilicus, 5days after.

My mission is to emphasize that the umbilicus is significant and important to children. We may not have all the answers why this is so; but I plead with health-care professionals to pay attention to the umbilicus and the umbilical pointing sign in children; in order to avoid unnecessary surgeries on them and to allow them to grow up normally i.e. psychologically and aesthetically.

Conjoined Twins

In trying to conclude this lecture ladies and gentlemen, I must say that a lecture in memory of the Doyen of Paediatric Surgery, Prof F.A. Nwako by a Paediatric Surgeon cannot be complete without a chip-in on the Surgery of Conjoint Twins in Nigeria. Mr Chairman, please permit me to complicate this lecture on the umbilicus with a brief mention of the first successful conjoint twin surgery by indigenous Nigerians in Nigeria.

Conjoined twins are anomalies of identical twins. The surgery for their separation and reconstruction are complex, difficult, and sometimes impossible.

In 1987, Prof F.A. Nwako led a surgical team that successfully separated and reconstructed a pair of pygopagus conjoined twins in a set of triplets (Fig.12a & 12b) at University of Nigeria Teaching Hospital, Enugu, Nigeria. This was the first time indigenous Nigerian Surgeons successfully separated conjoined twins in Nigeria. The triplets are now aged 35 years and live in Adazi-ani in Anambra State.

In 1993, Prof Nwako leading the same surgical team, successfully separated a pair of thoraco-omphalopagus conjoined twins with the division and sharing of a single liver (Fig.13a & 13b). Again, this was the first time in Nigeria that a

single liver was successfully shared among conjoined twins. The twins are now aged 29 years and live in Aba in Abia State.

In those years only 25% of conjoined twins in the world were successfully separated. Nowadays improvement in maternal health and childcare services combined with innovations in surgical techniques and facilities, have led to the improved survival rate of these babies.



Fig.12a: Pygopagus conjoined twins in a set of triplets, at birth in 1987.



Fig.12b: The triplets at 10 years



Fig.13a: Thoraco-Omphalopagus conjoined twins with one liver at birth 1993



Fig.13b: Separated Thoraco-Omphalopagus twins with shared liver at 6 months



Conclusion

Mr Chairman, Ladies and Gentlemen, Emeritus Professor F.A. Nwako merits the honour we give. He is a legend, and he left a legacy. He paved the way for most Paediatric Surgeons in Nigeria. He was a colossus in the medical, academic, and administrative arena. When he left UNTH for 'greater heights' to become the pioneer Vice Chancellor of Nnamdi Azikiwe University, he was greatly missed. His mannerisms and approach to issues earned him prominence among his peers. Abagana, Anambra State, Southeast Nigeria, and Ibos all over the world must be proud to have produced this extraordinary gem of excellence.

May the Soul of Prof FA Nwako continue to rest in Perfect Peace. Amen

Further Reading

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**EMERITUS PROFESSOR
FESTUS AGHAGBO NWAKO
1933 - 2014**