



5TH INAUGURAL LECTURE

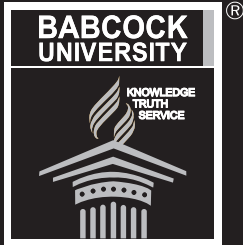
THE HAND THAT HANDLES THE SCALPEL

Professor Iheanyichukwu Okoro

MBBS, Ibadan; FMCS, National Postgraduate Medical College of Nigeria;
FWACS, West Africa College of Surgeons; FICS, International College of Surgeons;
Professor of Anatomy and Surgery

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BABCOCK UNIVERSITY
ILISHAN-REMO, OGUN STATE

THE FIFTH UNIVERSITY
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BY

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Distinguished Ladies and Gentlemen

Preamble

I feel highly honoured to be given the privilege to deliver the 5th Inaugural Lecture of this Great University, God's own University. This also happens to be the first in the College of Health and Medical Sciences. I am indeed very grateful to God and to the Vice Chancellor for this unique opportunity.

Mr. Vice Chancellor sir, while I was growing up, I loved engineering and wanted to be an Agricultural Engineer. But in my senior years at the Secondary School, my mother reminded me that as a child I promised her I will be a medical doctor so that I can help those that are sick. I couldn't quite remember that anymore. However, I gave it a thought and finally made up my mind to be a doctor. And since engineering was still running in my veins, I decided to go for Surgery, which is the engineering aspect of medicine.

Due to the exposure I had in Anatomy by great

teachers like Professor Ayodele Desalu I also came to love the subject. My experience at the Primary Examinations of the Postgraduate Medical Colleges further escalated my love for Anatomy which eventually made me the good surgeon I am today by the grace of God.

The foundation for today's lecture started in a Boardroom where I attended an interview for employment as a Consultant Surgeon. As soon as I settled down for the interview, I was asked the question "what is 'akanma'?" I was jolted by that question. "Akanma," what could it be? Since I didn't know exactly what it meant, I decided to give them the literal translation of the word. In my innocence and ignorance I said it means "the hand that holds the knife". There was a roar of laughter across the boardroom. I felt very embarrassed and asked to know whether what I said was wrong. I was asked to forget the matter. The interview continued and I was offered the job as a Chief Consultant Surgeon.

When I came out I asked around to know what "Akanma" meant. I was then informed that it was the money extorted from patients by unscrupulous surgeons before admitting them for surgery. Since I have never done any such thing I didn't know what it meant and I am sure my interviewers knew I was ignorant of the dubious practice. That was why they had a good laugh at me.

At Imo State University Owerri, I had the privilege of teaching both Anatomy and Surgery. During those years I was fascinated by anatomy of the hand, from the skin to the innermost muscles, nerves and vessels. I then embarked on the study of some aspects of the anatomy and surgery of the hand. I have slightly modified the topic from my original translation because of terrorists holding knives in their hands and beheading innocent people.

Introduction

Mr. Vice Chancellor sir, while I do not intend to bore this august audience with high-sounding anatomical terminologies, I will endeavour to acquaint them with some aspects of the anatomy and physiology of the hand. The Psalmist did not have the knowledge of the intricacies of anatomy of the body, but by inspiration he declared *"I will praise you because I am fearfully and wonderfully made, your works are wonderful, I know that full well"* Psalm 139:14 NIV.

We are truly wonderfully made. The hand is a prehensile, multi-fingered extremity located at the end of an arm or forelimb of primates such as humans, gorillas, chimpanzees and lemurs. But the highly mobile, functional and strong hand is a major distinguishing factor between human beings and non-human primates. The hand is an essential participant for activities of daily living, vocation and recreation. With the development of Braille writing, the hand can read for the blind, while with the Sign language it speaks for the mute. The jumbo jets, massive ocean-liners, and the skyscrapers are all works of the hand of man. When a skillful surgeon holds a scalpel blade over a patient, the life of that patient is in his hand. Fig. 1 shows a scalpel blade.

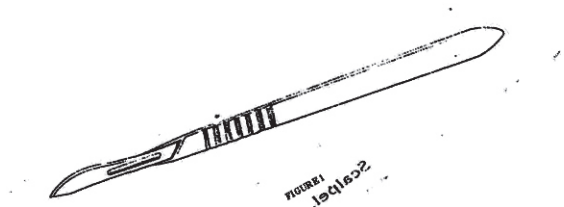


Fig. 1 -The Scalpel – The Surgeon's sign of profession.

Embryology of the hand

The development of the hand begins at the end of the fourth week of the formation of the embryo, as an out-pocketing known as limb buds. By the sixth week the bud has elongated some more with the flattening of the terminal portion to form the handplate which is separated from the proximal segment by a circular constriction¹.Fig. 2.

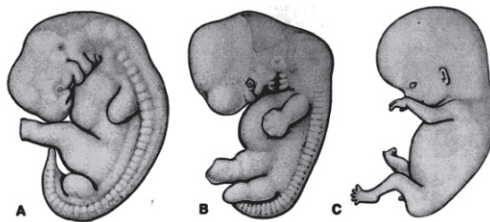


Fig. 2 -Development of the limb in human embryos. A- At 5weeks, B. At 6 weeks. C. At 8 weeks.

As the handplate is being formed, hyaline cartilages begin to condense in areas that will eventually form the digits. The digits will be separated by cell death in the intervening tissues. By day 56 of development, digit separation is complete.Fig. 3.

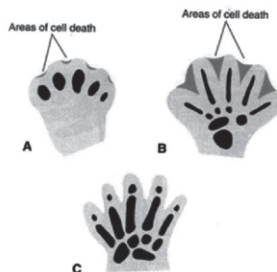


Fig. 3 - Formation of digits by areas of death. A. At 48 days, B. At 51 days, C. At 56 days.

Ossification-the process of deposition of calcium salts in the cartilage-transforms the cartilages into bones. Finally, vessels, nerves and muscles will migrate into the hand².Fig. 4.

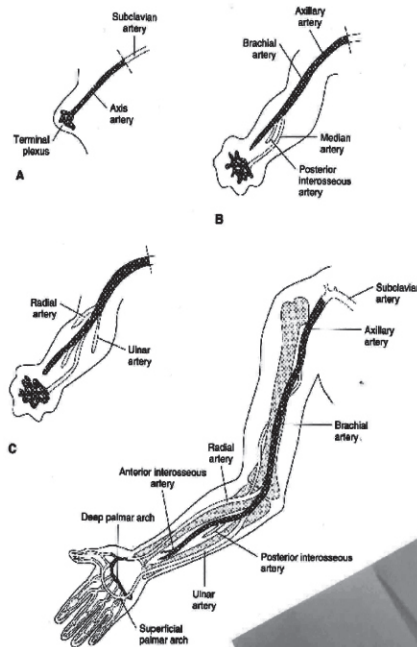


Fig.4- Shows development of the arteries of the upper limb. D is an adult upper limb.

I have just given a simple description of a very complex developmental process. One would wonder why the cartilages that form the phalanges did not develop as single columns but are separated by interzones that form the joints. Without these joints movement will not be possible. The God of creation has implanted into the DNA of man what should develop at what time and in what way. At the end of nine months gestation a brand new complete baby is born.

Because we are in a world of sin, this developmental process sometimes goes awry and congenital abnormalities occur. As a result of this, some babies are born without upper limbs (Amelia) or partially formed limbs (Phocomelia). Fig. 5. Some have fused digits or extra digits. Fig. 6.

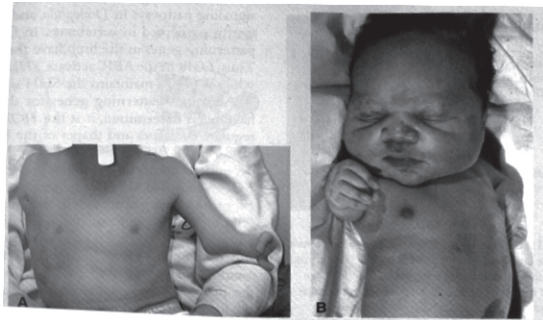


Fig.5 - Various forms of upper limb malformations – Amelia (absence of limb) or Phocomelia (Short limbs).

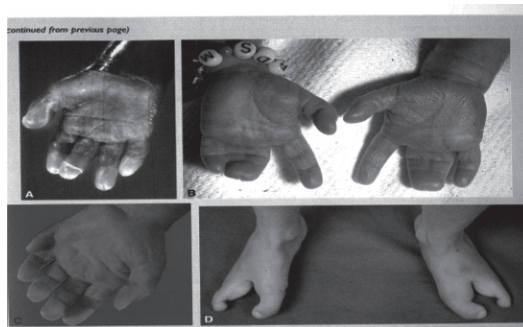


Fig. 6 - Various forms of digital malformations- Syndactyly (fused fingers) Polydactyly (Extra digits).

These defects may result from drugs taken by the mother during pregnancy or undue exposure to radiation.

Anatomy of the hand

Mr. Vice Chancellor sir, just as I did with the embryology section, I will try to simplify the anatomy of the hand without much of the anatomical jargons. The hand has 2 surfaces: the back is known as the **dorsum** and the front is known as the **palm**.

Dorsum of the hand

The skin of the dorsum is thin and lax. It can be picked up from

the underlying structures. This allows for the folding of the hand without unduly stretching the skin. It is innervated by the terminal branches of ulnar and radial nerves. These nerves stop short of the nail beds which are innervated by nerves from the palm. Therefore, the tip of the finger is innervated by the same nerve. This makes for better coordination of sensation at that part of the body³ Fig. 7.

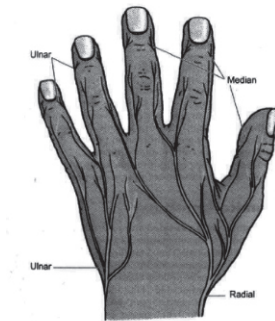


Fig. 7 - Cutaneous innervation of the dorsum of the hand.

A network of large veins can be seen at the back of the hand. These veins drain blood from the palm so that the pressure of gripping does not impede venous return. They eventually form 2 large veins on either side of the hand that transmit the blood from the hand to the heart.

Under the skin, there is a network of tendons emanating from the muscle of the forearm to the fingers. These tendons are responsible for the movement of the fingers. At the wrist, there is a fibrous band that holds these tendons down and prevent them from springing out or lying loose. It is known as the extensor retinaculum. Synovial sheaths act as lubricants to the tendons which are also covered by an expansion formed by the tendons of the intrinsic muscles of the hand. All these mechanisms improve the efficiency of the tendons³ Fig. 8.

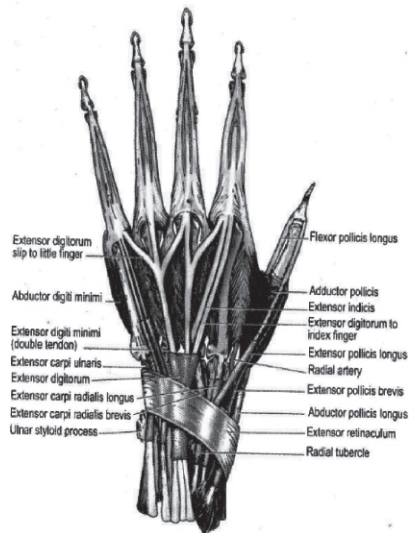


Fig. 8 - Shows the “arrangements” of the tendons synovial sheaths and muscles viewed from the back of the hand. Note the extensor retinaculum band, holding the tendons down.

Palm of the hand

Unlike the skin of the dorsum, that of the palm is very thick and devoid of hair follicles. It has plenty of sweat glands. It is characterized by flexion creases and papillary ridges. The papillary ridges on the digits are responsible for fingerprints. They also serve to improve the grip and increase the surface area of the palm. The skin of the palm is attached to the underlying fibrous structure known as palmar aponeurosis. This fixation steadies the skin when holding or gripping an object.

The skin of the palm is innervated mostly by the median nerve and the palmar branch of the ulnar nerve. As has been mentioned earlier, the nerve supplying the pulp of the finger also supplies the nail bed.

The hand normally has five digits namely:

1. Thumb

2. Index finger
3. Middle finger
4. Ring finger
5. Little finger

Each of these fingers receives a set of tendons, nerves and vessels. Also, the palmar aponeurosis sends out four slips to the fingers except the thumb. Fig. 9.

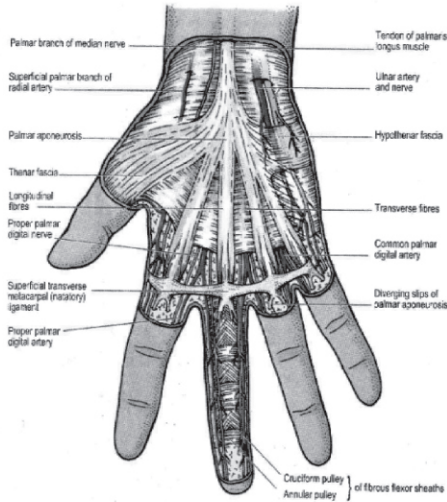


Fig. 9 –The Palmar surface of the hand showing the aponeurosis, ligaments, vessels and nerves.

The tendons run in synovial membranes covered by fibrous sheaths over the fingers. Of special mention are the small intrinsic muscles of the hand called Lumbricals and Interosseous muscles. While the long tendons of the muscles of the forearm are responsible for the gross movements of the fingers like extension and flexion, including firm grips, these intrinsic muscles are responsible for the intricate movements of fingers required for actions such as piano playing, painting, writing etc.

The hand has twenty seven bones which consist of eight carpal (wrist) bones, five metacarpal (central) bones and fourteen phalanges (finger bones) . The thumb has only 2 phalanges. Every other finger has three phalanges. All these

bones ossify at different ages and have been used to estimate the ages of athletes at age-related games.

The lateral and medial movements of the fingers are described in relation to the middle finger which is regarded as the centre of the palm. The thumb is the most mobile digit, responsible for firm grips. The inward movement of the thumb causing it to face the other fingers is called opposition.

Representation of the hand in the brain

The hand is supplied by two sets of nerve fibres: Sensory and Motor. The sensory nerves are responsible for receiving sensation from the environment and transmitting them to the sensory cortex of the brain for interpretation. In this part of the brain, the size of the cortical receiving area for impulses from a particular part of the body is proportional to the use of the part. The relative sizes of the cortical receiving areas are shown dramatically in fig.10, in which the proportions of the homunculus have been distorted to correspond to the size of the cortical receiving area for each part of the body⁴. Note that even though the trunk and the thigh are much bigger than the hand, it occupies a bigger area than both of them. Only parts of the mouth and face have wider representation than the hand.

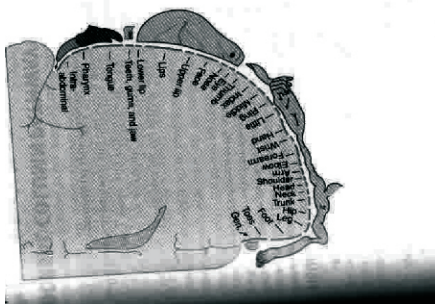


Fig.10 - Sensory Homunculus.
The size of the cortical receiving area for impulses from a particular part of the body is proportionate to the use of the part.

When signals are received in the brain impulses are sent through motor nerves to the hand to initiate reaction in

the form of movement. Just as in the sensory cortex, the portion of the motor cortex used by the hand is more than the portions used by the trunk and lower limb as shown in fig.11. This has shown that the hand is a very important part of the body involved with skillful fine voluntary movements. Only vocalization and the face occupy similar proportions⁵.

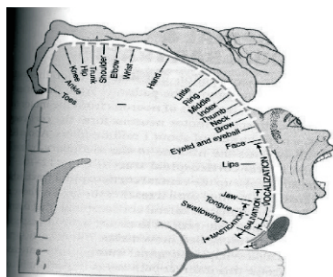


Fig.11 – Motor homunculus showing the same principle as the sensory one.

Palmistry

One of the interests shown about the hand by the ancient people was the use of the palm to predict the future of someone. This is a form of divination known as Palmistry or Palm Reading. There are two main types of palmistry:

1. Chiromancy – The study of line and creases.
2. Chirognomy – The study of the shapes of the hands.

In my discourse on the anatomy of the hand, I mentioned about the flexor creases on the skin of the palm of the hand. These creases are regarded as “lines” of the hand by palmists and the interpretations of these lines determine the future and fortune of the individual. This fascination came from the reasoning that those creases could not have been written into human hand without a reason⁶.

Ancient palmistry was said to have started in India several thousands of years ago. From there it spread to China, Persia, Tibet and Egypt. Aristotle (384-322 BC), Alexander the

Great (356-323 BC) and Hippocrates were all said to have practiced palmistry for various reasons⁷.

During the Middle Ages, the Roman Catholic Church saw the act of palmistry as a form of pagan superstition and suppressed it.

Modern palmistry was popularized by an Irish called William John Warner. He is more commonly known as Cheiro⁹.

Palmist's interpretation of the lines of the hand

Mr. Vice Chancellor sir, according to the palmist, there are four major lines on the palm of the hand, fig 12 namely:

1. Life Line
2. Heart Line
3. Head Line
4. Fate Line

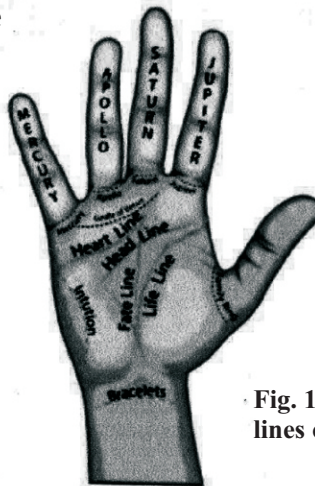


Fig. 12 - Shows the Palmists' lines of the hand.

I will briefly summarize the interpretations of these lines.

Life Line

This line starts at the edge of the hand between the index finger and the thumb, and curves down towards the wrist. It is believed to reveal information about one's encounter in life,

vitality and vigor, relationships with others, physical health and general well being. Ancient palmists believed it revealed how long the person will live but modern palmists do not think so.

Heart Line

This line starts at the edge of the palm below the little finger and flows towards the thumb ending, in most cases, between the middle and index fingers.

It is believed to represent love and attraction. It reveals the persons emotional state and the emotional and physical relationship with others. It represents matters of the heart including the health of the heart.

Head Line

This line starts from the edge of the palm below the index finger, above the life line. Often it is joined to the life line. It then runs towards the little finger below the heart line.

Palmists generally interpret this line to represent one's mind and the way it works, including learning style, intellectualism and thirst for knowledge. It is also known as the wisdom line.

Fate Line

This line runs from the middle of the palm near the wrist and runs towards the base of the middle finger. It is also known as the line of destiny. It is believed to represent one's life path including school and career choices, successes and obstacles. It also tells the effect society and world events have upon the person's life (i.e circumstances beyond ones control).

There is a peculiar line known as Simian Crease. It is a single transverse crease that runs across the palm of the hand. It is found in only about 3% of the normal population but in

over 50% of individuals suffering from Down's Syndrome. This shows that the crease is associated with chromosomal anomalies. But for the palmist it is formed by the fusion of the head and heart lines and is thought to endow such individuals with intensity of purpose or single mindedness¹⁰.

Mr. Vice Chancellor sir, I have taken time to dwell on the palmist's interpretations of the flexion palmar creases of the hand, not because I believe in what they are saying, but to reveal the futility of the figment of imagination of the unconverted human mind.

Palmistry, whether ancient or modern, is a form of divination. God warned the Israelites not to be associated with those that practice divination.

Deuteronomy 18:9-13 NIV.9“When you enter the land your God is giving you, do not learn to imitate the detestable ways of the nations there.10 Let no one be found among you who sacrifices their son or daughter in the fire, who practices divination or sorcery, interprets omens, engages in witchcraft. 11Or casts spells or who is a medium or spiritist or who consults the dead. 12Anyone who does these things is detestable to the Lord. Because of these same detestable practices the Lord your God will drive out those nations before you. 13You must be blameless before the Lord your God”.

God classified divination, which palmistry is, with witchcraft and necromancy. No child of God should practice or benefit from such deceitful and detestible practices.

The devil has deceived men into believing that they can reveal the future by whatever means. The devil himself cannot reveal the future. If he could tell the future, he would not have rebelled against God in heaven because the result he

got was not what he expected. If he knew the future he would not have instigated evil-minded religious leaders to crucify Christ. He didn't know that the death of Christ was to seal his doom and liberate fallen humanity from the clutches of evil. Therefore, anybody who claims to have the ability to reveal the future except as permitted by God is a pretender and should be rejected. Only God knows the future.

Isaiah 46:9, 10. "Remember the former things of old; for I am God, and there is none else; I am God there is none like me. 10 Declaring the end from the beginning and from ancient times the things that are not yet done saying, My counsel shall stand, and I will do all my pleasure".KJV

Those palmar creases were put there by God to help us fold our hands effectively. The skin of the palm is thick and without those creases we would not have been able to achieve firm grip on objects.

Mr. Vice Chancellor sir, we also took interest in the flexion palmar creases, not for palmistry but to know the pattern of these creases in our population (Okoro & Uloneme 2004)¹¹. We inspected and documented the palmar creases of 1000 subjects. These were drawn from within and outside of Owerri in Imo State. We had to reassure our subjects that the exercise was not for ritual or palmistic purposes. Consents were obtained from parents before young children were used for the study.

There were five major patterns of palmar crease identified in this study, fig. 13.

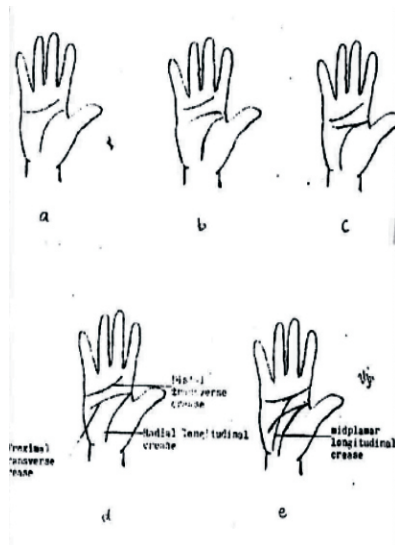


Fig. 13 -Patterns of major Palmar creases observed among the Igbos.

- a. Two unjoined creases
- b. Three unjoined creases
- c. Three creases. The longitudinal radial and the proximal transverse creases joining for about 1cm-1.5cm before reaching the radial border
- d. Three creases, the longitudinal radial and the proximal transverse creases joining just at the radial border.
- e. Four creases which includes a midpalmar longitudinal crease.

Majority of the subjects (68.8%) had 3 creases, followed by 4 creases (34.7%). Only 1.5% of the subjects had 2 creases. One significant finding of this study is the sexual dimorphism found among the subjects. While 63.5% of the male subjects have joined creases, only 48.6% of the females have joined creases. This was also found in studies done among the Spaniards. (Hernandez 1985)¹².

We further looked into the role of genetic inheritance in

the development of palmar creases (Okoro &Uloneme 2005)¹³. In this study, we investigated palmar creases of 10 families up to the fourth generation. The similarities between the parents and their offsprings was subjected to statistical analysis and found to be highly significant. It was therefore concluded that the formation of the palmar creases in the hand of the embryo in-utero was not by chance but by genetic inheritance. You may look at your palm to observe your palmar crease pattern.

Dermatoglyphics

Another structure of interest on the surface of the palm is the papillary ridge, also known as friction ridge. These ridges occupy the whole of the flexor surface of the hand. They serve to improve the grip and increase the surface area of the palm (Sinnatamby 2011)³. Those on the digits are responsible for fingerprints. These ridges are formed on the hand at about the tenth week of gestation (Pospisil *et al* 1989) and they remain permanent for life¹⁴.

After several years of study, it was found that these ridges form definite patterns on the finger tips. The dominant ones are:

1. The Arch
2. The Loop (which may be right or left)
3. The Whorl
4. The Tented Arch, Fig 14.

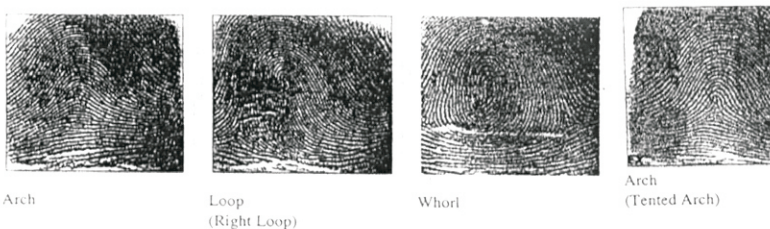


Fig. 14 - Shows the more common patterns of “fingerprints” arising from the papillary ridges of the palm.

In a study of the pattern of palmar ridges among the students of Delta State University Abraka, Odokuema and Igbigbi, found that the common patterns were loops, whorls and arches in descending order of frequency¹⁵.

And because no two individuals have exactly identical patterns, even in monozygotic twins, fingerprints have become a very reliable means of identification. (Herschel 1916)¹⁶. At your own time you may check on your fingerprint pattern.

Handedness

Mr. Vice Chancellor sir, one other area of hand use that has generated a lot of scientific and general interest is "handedness". This has been variously explained as the consistent preference for the use of one hand in skilled manipulative tasks, or a better, more precise performance with one hand. Hopkins (1997) observed that all primates have hand preferences and those preferences follow a clear pattern. The lemurs and other prosimians tend to be left handed, macaques and other old world monkeys are evenly split between lefties and righties¹⁷. Among gorillas and Chimpanzees, 35 percent are lefties while in humans it hovers around 10 percent. This is also in agreement with the findings of Hardyck and Petrino (1977), who also found that 10 percent of their study population are left handed¹⁸. In some countries it may be as high as 16%. Whilst handedness is well defined in most individuals, there are persons with mixed-handedness in which case the hand used depended on the task being performed¹⁹. Truly Ambidextrous individuals who can perform any task equally well with both hands are rare (Annett Marian 2002)²⁰. Males tend to be more left handed than females (Papadaton-Paston *et al* '2008)²¹.

Development of handedness

The cerebral cortex of the human brain consists of two hemispheres. The right hemisphere controls the left part of the body and vice versa. The nerve fibres emanating from those parts of the body cross in the brain stem on their way to the cortex. This is known as decussation, Fig. 15⁵.

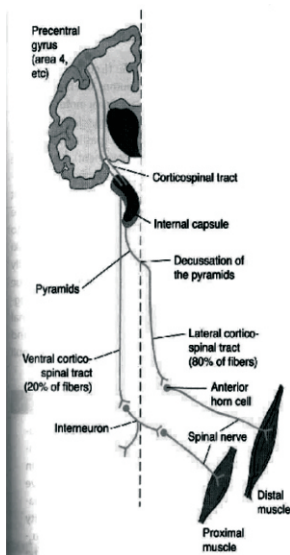


Fig. 15 - Corticospinal tracts showing the crossing over (discussion) of nervefibres on their way to the brain from the organs.

In my discussion on the representation of the hand in the brain, it was shown that on the motor cortex, the hand and speech vocalization occupied the largest part of that part of the brain. It is so because those parts of the body are involved in skilled tasks.

In most people, the part of the brain responsible for speech is in the left hemisphere (Broca Area). It is therefore suggested that both functions are better located in one hemisphere for better coordination. This also presupposes that the left-handed individuals will have their brain dominance on the right. However, it was found that nearly 30

per cent of lefties have left brain dominance. It was therefore concluded that the lefties showed less lateralization than the righties (Knecht *et al*, 2000)²².

Left-handers have also been found to have produced an above-average quota of higher achievers. A slightly larger number of left-handers than right-handers are especially gifted in music and math. In their study, Mc Manus & Bryden²³ were able to demonstrate that left-handed individuals performed better in executive-related tasks, that engage the right hemisphere. They also observed that performance improved as the left-handedness increased.

Discrimination against left-handers

Left-handed people have suffered unfair discrimination in many parts of the world. The words “dexterous”, and “dexterity” have their roots in the Latin word “dexter” which means “right”. So left-handers are regarded as clumsy, awkward or even unlucky. Many of the tools in this technological age have bias towards right-handed people.

In many countries including Nigeria, left-handers are forced to change to right. It is a taboo or a mark of disrespect to collect something from an adult with the left hand. In some parts of Eastern Nigeria, a stone is tied to the left hand to prevent the child from using it. Thus, such individuals are forced to change to the supposed correct hand, which is the right. Such children suffer severe psychological damage and are made to feel inferior. Even when the change eventually occurs, the child may suffer some other neurological deficits because both cerebral hemispheres are now being overtasked. One of such major consequence of change is spatial disorientation (uncertainty concerning the left and right).

There may be a delay in initiating writing with the newly adopted hand. Cheyne *et al*, in a study of 11,847, 11-

year old pupils across the UK demonstrated that those children whose writing hand were different from the superior hand obtained lower test scores in both reading and mathematics than pupils with consistent writing hand and superior hand. Thus, children who retained their left hands as the writing hand but have been forced to use their right hands for other skillful tasks were negatively affected by the change. Therefore children born with left-handed orientation should be left alone. That is how their brains are configured²⁴.

Handedness among the Igbos of Nigeria

Mr. Vice Chancellor sir, we investigated the pattern of handedness among the Igbos of Southeastern Nigeria. Our study involved 2794 subjects drawn from the five Southeastern states from ages 7 to 65 years. Out of the 2794 individuals used for the study only 138 (4.93%) were found to be strictly left handed. They preferred using left hand when writing, drawing, throwing, using scissors and doing other manual tasks. Majority of them acknowledged that they were at one time or the other, advised, persuaded, induced or even forced to change from left to right but all to no avail.

The figure of 4.72 per cent is much lower than the generally accepted 10 per cent found in studies from the Western world. We could rightly assume that majority of the original lefties have been forced to change. To buttress this point, we found that of the 138 left handed individuals, almost 60% of them were in the age group 7-17 years (Table 1).

Classification of left handed individuals based on age

TABLE 1	Age	Number	Percentage
	7 – 17	79	59.85
	18 – 28	32	24.24
	29 – 39	14	10.01
	40 – 65	7	5.30
	Total	132	100.0%

We also found, as in other studies that males are more prone to be left handed than females. The frequency of lefties among the men studied was 7.2% as against 2.8 per cent in women. This difference was statistically significant, $P < 0.001$ (Uloneme & Okoro 2006, De-kay 1966)^{25,26}.

The Geschwind and Galaburda's (1987) theory which claims that the elevated levels of testosterone are responsible for the higher prevalence of left handedness in males may provide the basis for the male to female left handedness dominance ratio recorded in this study²⁷.

Genetic factors in handedness

There have been a lot of theories to explain the acquisition of this trait or phenomenon. While some investigations have attributed it to environmental factors, others have linked it with humoral, neural or genetic factors. Orlebeke *et al* assessed hand preference in 1700 adolescent twin pairs and their parents and observed that left handedness was not significantly enhanced among twins compared to the general population. They further observed that while left handed fathers increased the probability of left handedness in sons but not in daughters, the left handed mothers increased the prevalence in both sons and daughters. They came to the conclusion that environmental factors were more likely to influence hand preference²⁸.

Such environmental factors include parental pressures as proposed by Laland *et al*²⁹. Geschwind and Galaburda tried to explain brain lateralization which includes hand preference on the basis of different levels of testosterone in the cerebral hemispheres. They claimed that higher levels of testosterone in the cerebral hemisphere slows down its growth thereby producing "Anomalous Dominance" characterized by left handedness and right hemispheric

visuo-spatial dominance²⁷.

However, in the study of hand preference of 59 opposite-sex and 61 same-sex dizygotic twins, Elkadi *et al* showed that there was no difference in the hand preference and sinistrality between the opposite-and-same-sex twins for either sex. They posited that since testosterone passes between twin in-utero, it did not affect handedness in twins³⁰.

In a meta-analysis of twins and singletons conducted by Sicotte *et al.*, they found a higher incidence of handedness in twins compared to singletons³¹. They also reported that identical twins are more likely to be concordant for hand preference than non-identical twins, which is consistent with a genetic model.

Stoyanoz *et al*³², have suggested that the season of conception may influence left handedness in males with genetic potentials for left handedness but not in females. In their study of 3182 young Bulgarians consisting of 2825 right-handers and 357 left-handers, they found a significant difference in the seasonal distribution of births of right and left-handers in males only. The incidence of left-handedness was higher among the participants born in winter. In the right-handers, increased birth rate was observed in spring and summer. They suggested that the high levels of mother's male hormones during spring and early summer play the role of a "left-shift" factor for the male fetuses with genetic potential for left-handedness.

Mr. Vice Chancellor sir, we also undertook to investigate the role of the genetic factor on handedness among the Igbos of Southeastern Nigeria. We studied 1596 subjects consisting of 1513 right-handers and 83 left-handers drawn from the five states of Southeastern Nigeria. It was observed in this study that while 24.1% of our left handed subjects had left handed parents, only 2.8% of the right-

handlers have left handed parents. This difference was found to be highly statistically significant. This is in support of a genetic inheritance for handedness.(Uloneme & Okoro 2006)³³.

Surgery of the hand

Hand surgery has grown to become a sub-specialty in Surgery. However, a general surgeon needs to acquire basic tenets in hand surgery. He should be able to handle emergency cases involving the hand. A sound knowledge of the anatomy of the hand is required to be able to adequately manage hand injuries. Proper history and physical examination to determine the extent of injury and structures damaged should be undertaken. X-rays, Computerized Tomographic Scan (CT-Scan) and Magnetic Resonance Imaging (MRI) may help in the assessment of the patient, based on the case. It is of utmost importance to ensure that there is blood supply to the distal parts of the hand. The injured hand should be immobilized in a position of function in order to enhance mobility after healing. The position of function involves a slight 30% extension of the wrist, flexion of fingers and slight opposition of the thumb. The underlying goal of all aspects of hand surgery is to maximize mobility, sensibility, stability and strength, while minimizing pain.

The key points in the surgery of the hand can be summarized as follows:

1. Surgery of the hand is a regional specialty, integrating components of neurologic, orthopaedic, plastic, and vascular surgery.
2. Understanding hand anatomy is the key to proper diagnosis of injury, infection, and degenerative disease of the hand.

3. After evaluation and/or treatment, patients should be splinted to protect the injured digits and keep the collateral ligaments of the injured joints on tension (metacarpophalangeal joints flexed, interphalangeal joints extended).
4. Clinical examination, particularly noting the area of greatest tenderness and/or inflammation, is the most useful diagnostic tool for hand infections.
5. If a patient managed conservatively for “cellulitis” does not improve within 24 to 48 hours of appropriate IV antibiotics, abscess must be suspected.
6. Vascular injuries producing warm ischemia (incomplete amputations or direct vessel trauma with compromised distal perfusion) must be addressed urgently to prevent irreversible tissue loss.
7. Healing of an injured or diseased structure in the hand is not the endpoint of treatment; the goal of any intervention must be to obtain structural healing, relief of pain, and maximization of function³⁴.

General operative principles

A bloodless field is very essential for a good outcome in hand surgery. This can be achieved by elevating and exsanguinating the hand, and applying a tourniquet. In an unanaesthetized patient, the tourniquet may be tolerated for a maximum of 30 minutes but in anaesthetized patients it may be in place for two hours. Local, regional (brachial plexus or intravenous Bier block) or general anaesthesia may be used depending on the length and extent of the operation. Incisions must be aligned to the palmar creases. Longitudinal incisions should be avoided as much as possible to prevent scars that will limit motion. Zigzag incisions are preferred or incisions along the creases.

Disorders of the hand

Disorders of the hand rarely affect life but can significantly affect ability to function. Disorders of the hand can be classified as follows:

1. Congenital anomalies
2. Injuries
3. Infections
4. Degenerative diseases
5. Tumors

I will briefly discuss them.

1. Congenital anomalies of the hand

The most common types are fused fingers (syndactyly), which may be simple or complex depending on whether the bones are involved, and extra digits (polydactyly). Other forms of anomaly are occasionally seen. The affected babies should be examined for other associated anomalies. Xrays are needed to exclude bony involvement.

In the treatment of syndactyly, various forms of plastic surgery may be used including Z-plasty and skin grafting to separate the fingers. For polydactyly, it depends on whether the bone is involved or not. If the stump has a narrow base without bony involvement it can be tied off. However, if the base is broad and the bone is affected, the correction should be done in the theatre.

2. Injuries resulting from trauma and burns

These are by far the most common disorders of the hand. The hand is the most active part of the body, both in the industry and at home. As a result, it is the most commonly injured part of the body.

In the management of such injuries, treatment is directed at specific structures damaged-skeletal, tendon,

nerve, vessels or skin. Stable skeletal architecture must be maintained. Post-injury mobility depends on stable and well aligned bones, Fig.16.



Fig. 16 - X-ray picture of the hand showing the normal bony architecture of the hand.

Mr. Vice Chancellor sir, I will illustrate the management of injuries of the hand with a case we handled at the Ahmadu Bello University Teaching Hospital in Zaria.

An 11-year old boy was rushed into the Emergency Room of the hospital having been involved in a grinding machine accident. The boy apparently was using his right hand to push some grains into the machine when it got trapped and before the machine could be put off, it has crushed the hand. The agony of the lad could only be imagined. While crying, he was repeatedly singing a song to the machine "Engine mugu engine, Allah sine maka engine," meaning "Engine you are very wicked, God curse you engine".

We immediately sedated him and went ahead to evaluate him. The investigations we did included x-ray to ascertain the integrity of the bones. We discovered that some

bones had been broken. We proceeded to the theatre for fuller assessment of the injury. He was anaesthetized, the limb was exsanguinated and tourniquet was applied. This was done to stop the bleeding from the injury and to give us a bloodless field for the surgery. I was the Chief surgeon with two assistants.

The surgery took over three hours. We painstakingly and meticulously put the pieces together after a thorough wash-up of the wound with sterile water. Muscle to muscle, tendon to tendon, and skin to skin. The fractured bones were properly aligned. The structures that could be salvaged were salvaged. Unviable ones were excised. We observed that he had lost some of the skin covering the hand.

Fortunately, we further observed that the deeper arteries were preserved so that blood supply to the distal parts of the hand was intact. That gave us some respite because if it were not so we would have lost the hand.

After surgery the hand was splinted in a position of function after being dressed with antibiotic impregnated gauze and covered with wool. The hand was elevated to prevent swelling.

The postoperative measures included antibiotics, regular dressing and skin grafting of the exposed parts of the hand. After staying two months in the hospital he was discharged. Fortunately wounds and fractures heal faster in children than in adults. When he was seen again in the follow-up clinic, the hand has healed reasonably and the boy was full of smiles. The parents were also very grateful. Mr. Vice Chancellor sir, that is the joy of a surgeon.

Infections of the hand

The commonest cause of infection in the hand is trauma. The predisposing factors include diabetes and neuropathies.

Other forms of infection include³⁵:

1. Felon (Pulp abscess) popularly known as whitlow
2. Paronychia, which is infection around the nail.
3. Midpalmar abscess which occurs in the space at the centre of the hand.

The most mismanaged of these infections is the felon. People suffering from this disease hardly go to the hospital for proper management. Some will be applying red oil, while others will open up lime fruits and stick the inflamed finger into the lime, waiting for the abscess to rupture on its own. Little do they know that by the time the abscess ruptures a lot of tissue has been damaged by the pus, sometimes involving the distal phalanx of the finger. The tension in the abscess causes very severe throbbing pain and also leads to either osteomyelitis of the bone or necrosis (death) of the affected bone. The dead bone disappears and the finger become stunted or even bent.

The proper management involves a few days of appropriate antibiotics and pain-killers. If it does not resolve but gets tense and swollen, an abscess has formed and must be drained immediately by a surgeon. Don't be hanging your sore fingers as a flag and be attracting public sympathy. Go to the hospital and be properly treated. The outcome is always much better than when managed at homes.

The treatment of paronychia may involve the removal of part, or all of the affected nail for proper drainage of the abscess. Fortunately, the nail grows back if the nail plate is still intact.

Degenerative disease of the hand

These affect mostly the joints and the fibrous tunnels of the hand. They lead to stiffening and deformities of the joints and difficulty in moving the tendons of the hand. Complex surgical procedures are needed to correct them.

Tumours of the hand

The tumours may be benign (innocent) or malignant (cancer). Malignant cases tend to spread beyond the hand and may cause death if not treated early enough. Tumours can arise from any of the structures in the hand, from the bones to the skin. Proper attention is needed to prevent catastrophic outcome³⁶.

Contributions to the University Community

Mr. Vice Chancellor sir, permit me to mention some of my contributions to the university community. I have served in four different universities in the country namely:

1. Ahmadu Bello University, Zaria
2. Abia State University, Uturu
3. Imo State University, Owerri
4. Babcock University, Ilishan-Remo

However, I will limit this discussion to the last 2 Universities.

I joined the services of Imo State University in October 1999 as a Senior Lecturer and was immediately appointed the Pioneer Coordinator of the School of Medicine at the time the university was using the Collegiate system. When the university changed to the Faculty system in 2001, I was appointed Head, Department of Anatomy and Neurology. I was also appointed the Deputy Dean of the School of Medicine. I was also acting as the Dean since there was no de-facto Dean at that time. Working together with my then Provost, Professor Bernard Jiburum, we nurtured the young medical school. We had initial hiccups that delayed accreditation but the school eventually stabilized. When the Medical and Dental Council of Nigeria (MDCN) came to the school for accreditation in 2008, my Anatomy Department was adjudged as one of the best in the country at that time. In April 2002, I was appointed the Director, Institute of

Neuroscience and Biomedical Research (INBR), an affiliate of the University.

During my tenure, the Institute established linkages with International Brain Organization (IBRO), International Society for Neurochemistry (ISN) and Society of Quality Assurance (SQA). We also hosted four International neuroscience conferences between 2006 and 2010. When the then Vice Chancellor of the University observed my commitment to duties he further appointed me the Chief Examination Officer for the University from 2003-2005. All this while, I was still functioning as the HOD Anatomy and Acting Dean of the School of Medicine. Did they not say that the reward for hardwork is more work! When I left Imo State University for Babcock University, they needed 3 persons to take over my responsibilities.

I assumed duty as the Provost of College of Health and Medical Sciences of this great University in January 2010. At that time, the only major building on ground for the establishment of the Benjamin Carson Sr. School of Medicine(BCSM) was the 140-bedded Hospital Building which needed to be grossly modified to reasonably meet the standard required of a Teaching Hospital. With the support of my President/Vice Chancellor, Prof. J. A. Kayode Makinde, we embarked on massive construction of the buildings that are now found at the Babcock University Teaching Hospital (BUTH) area and equipping them for service and teaching.

The first set of 14 Medical students began lectures in the school in January 2012. The BCSM was formally inaugurated on June 2, 2012. By the grace of God and with total support from the University Administration, the school is now the fastest advancing new medical school in the country having attained two levels of accreditation in less than 3 years. Very soon, the first set of students will be going

to the METAS Adventist Hospital, Surat, India, which has also been accredited by the MDCN, for their clinical rotation in Medicine and Surgery.

In October 2010, I was elected the sole Senior Vice President/Deputy Vice Chancellor of Babcock University at the quinquennial session of the West-Central Africa Division (WAD) of the Seventh-day Adventist Church held at Abidjan Cote D'Ivoire. Hitherto, there have been 2 Senior Vice Presidents (Academic and Management Services). This is in addition to my responsibility as the Provost College of Health and Medical Sciences. So, I was saddled with 3 persons' jobs.

I thank the Almighty God for sustaining me all this while. I am still serving in these capacities till date. I have also been appointed the Chief Operating Officer (COO) of the university overseeing the day to day running of the university and reporting to the Chief Executive Officer (CEO) of the university, the President/Vice Chancellor.

Since my tenure as the Senior Vice President, the number of schools have grown from four to nine undergraduate schools and a vibrant School of Postgraduate Studies (SPGS). The departments have also increased from 16 to 42. We shall soon present 22 of our programmes for accreditation by the National Universities Commission (NUC). In preparation for the forth-coming accreditation, we have been able to establish the following facilities;

1. State of the art Language Laboratory for English and French.
2. Accounting Laboratory.
3. Econometric Laboratory.
4. Entrepreneurial Laboratory.
5. Screen House for Agriculture and Biochemistry.
6. We have also moved into our ultramodern Laz Otti Memorial Library(LOML)

My positions as the Senior Vice President and Provost have entitled me to serve in the under-listed committees of the University in various capacities.

1. Administrative Committee – Vice Chairman
2. BUTH Board – Vice Chairman
3. Senate – Vice Chairman
4. Human Resources Committee – Vice Chairman
5. Way and Means Committee - Vice Chairman
6. Congregation – Vice Chairman
7. Academic Standards Board – Chairman
8. Employee Welfare & Disciplinary Committee – Chairman
9. Development Committee – Chairman
10. Employee Housing Committee – Chairman
11. Babcock Investment Group (BIG) Board – Member
12. Babcock University Governing Council - Member

In all these committees I have contributed significantly to the quality of decisions reached and in the execution of those actions.

At the University Church, I am currently the Pioneer Church and Babcock District Adventist Men's Organization Leader. Since I took over the leadership in August 2013, the organization has really come alive again. We have been involved in some mission-oriented programmes including a radio discussion programme on Hope FM.

Hand in the Bible

Mr. Vice Chancellor sir, as a Christian physician, I cannot conclude this lecture without making reference to what the Bible has to say about the hand. There are 1790 references to the word “Hand” in the King James version of the Bible, next

only to “God” that is mentioned 4094 times. This shows the centrality of the hand to the activities of both God and man. There are other references that showed clearly that the hand was used but it was not specifically mentioned. For example, in the creation of man, God would have used His hands but it was not so mentioned. The first reference is in *Genesis 3:22 which said “And the Lord God said, “Behold, the man is become as one of us, to know good and evil; and now, lest he put forth his **hand** and take also of the tree of life and eat, and live forever.” (KJV)*

The last of the hand passages in *Revelation 20:4 “And I saw thrones and they sat upon them and judgment was given unto them; and I saw the souls of them that were beheaded for the witness of Jesus, and for the word of God, and which had not worshipped the beast, neither his image, neither had received his mark upon their foreheads or in their **hands**; and reigned with Christ a thousand years.” (KJV)*

These are significant passages in the Bible. While the former showed how man was denied eternal life as a result of sin, the latter assures us that if we remain faithful we shall reign with Christ, and eternal life will be restored.

Apart from these, there are 2 other hand passages that have brought succour to my mind as a Christian medical doctor and scientist. These have to do with God Himself. *Isaiah 41:10 “So do not fear, for I am with you, do not be dismayed for I am your God. I will strengthen you and help you, I will uphold you with my righteous right **hand**”.(NIV)*

Isaiah 49:15, 16 (firstpart) “Can a mother forget the baby at her breast and have no compassion on the child she

*has borne? Though she may forget, I will not forget you.
See, I have engraved you on the palms of my **hands**.”(NIV)*

These passages give the assurance of His leading in my life as a child of God and how He jealously cares for and protects His own. Whatever that has been engraved on your palm calls for constant remembrance.

Recommendations

1. Christians should not consult palmists or palm readers. It is a form of divination that is detestable to God. Both those who practice palmistry and those that consult them are being deceived by the devil.
2. The flexion palmar crease could also be used for personal identification. No two palms are exactly the same even in the same individual. The pattern is constant and does not change with age except there is a form of trauma to the hand.
3. Parents and relatives must desist from the practice of forcing left-handed individuals to change to the use of the right hand. It does both neurological, intellectual and psychological damages to the affected person.
4. The community is admonished not to treat affectations of the hand with levity. Small cuts, and abscess may escalate and lead to severe disability if not properly handled by well-trained medical personnel.

Acknowledgement

Mr. Vice Chancellor sir, at this juncture, please permit me to acknowledge some of those who have helped me in my academic and professional career.

My most sincere gratitude goes to God Almighty and our Lord Jesus Christ for showing me so much love and mercy. I have gotten a fair share of roller-coaster moments

but in all these, God has been faithful in my life. May His name forever be praised.

My late parents, Ephraim and Anna Okoro were sources of inspiration and help to me. They saw to it that all their children had sound education. My mother and maternal uncle, Elder Rowland Okoronkwo were instrumental to my becoming a doctor today. I am eternally grateful to them.

To my teachers in the medical school at the University of Ibadan, I am very grateful, particularly to Professor Ayodele Desalu who gave me a sound understanding of Anatomy. In those days, with his pipe at the corner of his mouth and immaculate white lab coat, he was a sight to behold and we all aspired to be like this compendium of Anatomy.

I am also indebted to Professor Tope Mabogunje who supervised my Postgraduate training and made me pass all my examinations at the first attempt. He was a teacher par excellence.

I thank Professor Frank Akpuaka of the College of Medicine, Chukwuemeka Odumegwu Ojukwu University (former Anambra State University), Uli. He was my mentor and role model. A Professor of Anatomy and Surgery, whom I very much wanted to be like. Thank God that today I have achieved that goal of becoming a Professor of Anatomy and Surgery.

I am also grateful to Professor Polycarp Nwoha of the Department of Anatomy, Obafemi Awolowo University, Ile-Ife for encouraging me to become a neuroscientist. I also thank Professor Richard Brown of the Department of Life Sciences Dalhousie University, Halifax, Canada for putting me through the rudiments of neuroscience during my short sojourn in Canada.

I am exceptionally indebted to the President/Vice

Chancellor of Babcock University Professor J. A. Kayode Makinde for finding me worthy to be appointed the Provost, College of Health and Medical Sciences of this great University. As if that was not enough, you nominated me for the subsequent election as the Senior Vice President. Thank you sir for believing in me. I hope I have not disappointed you. I would not have achieved anything here without your ardent support.

The best thing that happened to me is the wife the Lord gave me. Prof. Clara Okoro has been my most trusted companion who has been by me through thick and thin. I am eternally grateful for your love, encouragement, and lack of patience for slothfulness. Together with our adorable children-Pastor Ahaoma and Dr.(Mrs) Ugochi Aham-Onyebuchi, Dr. Nnamdi, Okoro, Bernard and Daisy Onyenro and Precious Okoro, you have borne with my irritating work schedule and long periods of absence, I salute you all.

I gratefully acknowledge the support I have received from my siblings and in-laws. They have been a source of encouragement to me.

I am immensely indebted to my Deans and Heads of Departments in the main University and my colleagues at the Babcock University Teaching Hospital. I have enjoyed your support in the administration of the Academic Division of the University and the Teaching Hospital.

I also appreciate the Associate Officers in the Office of the Senior Vice President namely Prof. C. C. Nwosu and Dr. Jonathan Nwosu.

I am also thankful to Prof. Grace Tayo, Director of Research and International Cooperation for working hard to ensure that the culture of Inaugural Lectures being given regularly is sustained.

I thank all my medical students and residents, many of

whom are now professors in various disciplines of medicine, for making me proud as a medical educator.

I immensely appreciate my Confidential Secretary, Mrs. Florence Agbeniga for painstakingly typing this lecture, and my Office Assistance, Mr Tokunbo Afolabi for working extra hours with the Secretary to see to it that this lecture was produced on time.

I am also grateful to the members of the Inaugural Committee for their immense contribution in the preparation of this lecture. Their useful suggestions enhanced the quality of the final copy.

Finally I want to express my sincere gratitude to this august audience for finding time to come and listen to this lecture. You would have made other uses of your time but you chose to be here. I appreciate you all. You have made my day. May the Lord honour you all.

Conclusion

Mr. Vice Chancellor sir, in concluding this lecture I wish to reiterate that the hand is a special gift God has given us as human beings. Three features differentiate us from other primates namely:

1. The complexity of human brain
2. Speech and language
3. The hand

Therefore, we have to take good care of our hands.

Handedness is an inherited trait which adds to the variety of human characteristics, which is the spice of life. Just as we have dark, fair, white and yellow skinned people, so we have right handed and left handed individuals. We should learn to tolerate the differences in other people. Our hands were not given to us to send us to hell. Rather, they are

there to assist us take care of ourselves and to praise God with. When we attempt to predict the future by looking at our hands we are trying to play God.

Deuteronomy 29:29. "The secret things belong unto the Lord our God; but those things which are revealed belong unto us and to our children forever, that we may do all the words of this law".(KJV)

Mr. Vice Chancellor sir, I rest my case. Thank you all for listening.

REFERENCES

1. Sadler TW. Langman's Medical Embryology. 12th Edition 2012. Philadelphia.Lippincott, William and Wilkin (LWW). pp 151 -161.
2. Dudek RW, Fix JD. Embryology, 2nd Edition 1998. Philadelphia LWW.pp 217-225.
3. Sinnatamby CS. Last's Anatomy; Regional and Applied 12th Edition, 2011. Churchill Livingstone. pp 78-91.
4. Barrett SM, Berman S, Boitano S, BrooksHL. Ganong's Review of Medical Physiology 24th Edition 2012.McGraw Hill.pp 168-169.
5. Barrett SM, Barman S, Boitano S, Brooks HL. Ganong's Review of Medical Physiology 24th Edition 2012, McGraw Hill.pp 236-239.
6. Dwivedi B. Wonder of Palmistry. 2002. Diamond publications. pp16-20.
7. Dwivedi B. Wonders of Palmistry. 2002. Diamond Publications. pp 25-26.
8. Brandon Jones D. Practical Palmistry, 3rd Edition, 1990. Rider. pp 60-65.
9. Sharma HD. A-Z of Palmistry, 1995, Sterling Publications. p 95

10. Frith H, Heron-Allen E. Chiromancy, or the Seviences of Palmistry. 1883. George Roitledge and Sons.pp20.
11. Okoro I. O, Uloneme GC. The Pattern of Palmar Flexion Creases Among The Igbos of South Eastern Nigeria. J. Experimental and Clinical Anatomy. 2004;3 (2): 38-40.
12. Hernandez M. Palmar Creases in Spaniards. AnthropodAnnz-1985;43: 187-190.
13. Okoro I. O, Uloneme G. C. The Role of Genetic Inheritance In theDevelopment of Palmar Creases. J. Expt&Clin. Anat 2005;4(2): 40-43.
14. Pospisil MF, Pospisilova V, Kajabova H. Formation of Papillary surface of the hands and feet in prenatal development in man. BratisLekListy 1989, 90 (70) 499-506.
15. Odokiema EI, Igbigbi PS. Digital dermatoglyphics in students of Delta State University, Nigeria. J. Expt&Clin. Anat. 2005;40):30-32.
16. Herschel WJ. The origin of fingerprinting. 1916 Oxford University Press.
17. Hopkins W, Russel J, Freeman H, Buchier N, Reynolds E, SchapiroJ. The distribution and development of handedness in captive chimpanzees (pantroglodytes). Psychological Sciences, 1977;16(6):487-492.

18. Hardyck C, Petrinovich LF. Left-handedness. *Psychol Bull*, 1977; 84(3):385-404.
19. Steele S, Mays S. Handedness and directional asymmetry in long bones of the human upper limb. *International Journal of Osteoarchaeology*, 1995;5:132-134.
20. Annett M. Handedness and Brain Assymetry 2002. Psychology Press. pp 20-25.
21. Papadatou-Pestou M, Martin M, Munafo MR, Jones GV. Sex differences in left-handedness: a meta-analysis of 144 studies. *Psychological Bulletin* 2008; 134 (5):677-699.
22. Knetcht S, Drager B, Deppe M, Bole L, Lohmann H, Floel A, Ringelstein EB, Henningsen H. Handedness and hemispheric dominance in healthy humans. *Brain*:2000, online.
23. McManus K, Bryden MD. Developmental Neuropsychology. In Rapin L, Segalowitz SJ (Eds). *The genetics of handedness, cerebral dominance and lateralization. Handbook of Neuropsychology* 1992. Elsevier, Amsterdam pp 121.
24. Cheyne CP, Roberts N, Crow TJ, Leask SJ, Garcia-Finana M. The effect of handedness on academic ability: A multivariate linear mixed model approach. *Laterality* 2010;15 (4) 451 – 464.

25. Uloneme G, Okoro I. Handedness among Igbo of South Eastern Nigeria. *J Expt. & Clinical Anatomy* 2006; (1):44-47.
26. Dekay J. T. *The Left Handed Book* 1966. M Evans and Company Inc. pp 34-42.
27. Geschwind N, Galaburda AM. Cerebral lateralization biological mechanisms, association and pathology. A hypothesis and a program for research. *Archives of Neurology* 1987, 42:634-654.
28. Orlebeke JF, Knol DL, Koopmans J, R, Boomsma DI, Bleker OP.
Left handedness in twins: Genes or environment? *Cortex* 1966; 32(3):479-90.
29. Laland KN, Kumm J, Vanhorn JD, Feldman MW. A Gene-culture model of human handedness. *Behaviour Genet.* 1995; 25:433-445.
30. Elkadis S, Nicholls ME, Clode D. Handedness in opposite and same-sex dizygotic twins: Testing the testosterone hypothesis. *Neuroreport* 1999; 10(2): 333 – 6.
31. Sicotte NL, Woods PP, Maziotta JC. Handedness in twins: A meta-analysis. *Laterality* 1999; 4(3) 265-86.
32. Stoyanov Z, Nikolova P, Pashaliva I. Seasons of birth, Geschwind and Galaburda hypothesis, and handedness. *Laterality* 2011;

16(5) 607-619.

33. Uloneme G. Okoro I. Genetic effect on handedness among the Igbos of SouthEastern Nigeria. J. Biomed. Afric. 2005; 3(2):45-48.
34. Lifchez SD, SenSk, Surgery of the hand and wrist. In Brunicardi; FC, (Ed).Schwatz's Principles of Surgery. 9th Edition 2010. McGraw Hill.pp 1609-1639.
35. Netscher D, Murph K, Fiore II NA, Hand Surgery. In, Townsend CM, Beauchamp RD, Evers BM, Mattox KL (Eds). Sabiston Textbook of Surgery.The Biological Basis of Modern Surgery.19th Edition 2012. Elsevier Sanders pp 1952-2002.
36. Young D, Hansen S. Hand Surgery. In Doherty GM (Ed). Current Diagnosis and Treatment: Surgery. 13th Edition 2010. McGraw Hill. 1132.1152.

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