# THE ADVANCES OF PHYSIOTHERAPY

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**GREETINGS**

First of all, I bring you warmest greetings from three major areas where this speaker renders selfless services.

Greetings from the Lagos University Teaching Hospital, Idi-Araba , Lagos Nigeria where I serve as a Consultant Physiotherapist and the Head of the Clinical Department of Physiotherapy;

Greetings from the College of Medicine, University of Lagos, Idi-Araba, Lagos, Nigeria where I hold the position of Professor and Head of the Department of Physiotherapy; and

Greetings from the Secretariat of the Medical Rehabilitation Therapists Board of Nigeria where I serve as the Registrar of the Board.

Before going into the substance of my lecture, let me make available to this gathering an item of information about the Medical Rehabilitation Therapists Board of Nigeria. This Board i.e. the Medical Rehabilitation Therapists Board of Nigeria which was constituted by an Act of a Nigerian Decree No. 38 of 1988 was inaugurated on December 29, 1992 in Nigeria. The Board is a parastatal, an arm of the Federal Ministry of Health in Nigeria. Unlike the other Boards or Councils, the Medical Rehabilitation Therapists Board of Nigeria has a heterogeneous nature in the sense that the Board controls the training and clinical practice of five different medical professions in Nigeria. These include:

1. Physiotherapy

2. Osteopathic Medicine;

3. Chiropractic Medicine;

4. Occupational Therapy; and

5. Speech Therapy and Clinical Audiology

It is by coincidence that the Registrar of this Board happens to be my humble self a Consultant Physiotherapist and a Professor of Physiotherapy.

**INTRODUCTION**

YESTERDAY we know;
TODAY we know in part;
TOMORROW we do not know but we can speculate and predict scientifically or philosophically or spiritually.

This being so, this inaugural lecture on the "Advances of Physiotherapy will first attempt to define the term "PHYSIOTHERAPY", thereafter, it will go into the realm of History, this is, the yesterday that we know, to describe briefly physiotherapy as it was known and practiced. The link in time between the past and the present will follow. The modern age of physiotherapy, that is, the "TODAY" that we known in part will then received attention. What is known up to date in physiotherapy that is, the "TODAY" which has already been described as the atomic age in physiotherapy will then serve as a spring board to launch into the future.

But before launching into the future, let me first present my scientific and professional endeavours; enumerate a few of my efforts through the media; review some achievements

in prints, that is, in books and monographs; and then gravitate to free professional consultations leading to “take home” for the audience. Then we shall conclude with an attempt to describe the path-way to the nuclear age of physiotherapy in this third millennium.

## WHAT IS PHYSIOTHERAPY?

Very simply, Physiotherapy means Physical Therapy. Using a definitive vocabulary, Physiotherapy is a professional body of knowledge, the Arts and Sciences of which are available in theory and applied clinicals Specifically, Physiotherapy is the treatment and rehabilitation of disease conditions, deformities (either congenital or acquired) and traumatic injuries by physical means. Such physical means can be in the form of physical exercise (i.e. as in Exercise Therapy), massage, manipulations (i.e. of soft tissues or of the musculoskeletal system) and the use of a variety of physical agents such as water at therapeutic temperatures (i.e. as in hydrotherapy) lights or radiations, (i.e. as in Actinotherapy), heat including moist, dry and radiant heat as in thermotherapy, electricity including the use of low, medium and high frequency electrical currents (i.e. as in Electrotherapy), low temperature media such as ice or as can be effected by some chemicals (i.e. as in Cryotherapy), applied mechanical and electro-mechanical appliances including applied supportive gadgets, and the use of sound waves including ultrasonic energy, (Owoeye, 1996).

## THE PRE-HISTORY PERIOD OF PHYSIOTHERAPY

Who says Physiotherapy is young? Although the formal institution of the profession of Physiotherapy in many developing countries like Nigeria may be recent, the actual practice of physiotherapy in several oriental and occidental countries is very old. By traditional methods in these countries, the practice of physiotherapy by man has existed as far back as the attainment of nervous consciousness by man. Without knowing it, and without the systematic and scientific procedures, the practice of physiotherapy during the

pre-history time grew with the growing consciousness or awareness of man, (Owoeye, 1988 – 89).

The first primitive man who crawled into sunshine for its warmth and its vitalizing effects unknowingly initiated the procedure of Heliotherapy; while the first man who first bathed an injured limb in a steam had unconsciously instituted Hydrotherapy; and the first man who rubbed an injured limb or injured soft tissues of his body or that of his siblings gave birth to massage or soft tissue manipulation. Prominent among the big personalities in history who either advocated for or utilized physiotherapy procedures included: Hypocrites, Kon-fu, Herodotus, Socrates, John Wesley and several others.

At about 3000 B. C., historical records mentioned various people in various lands at various times especially the Chinese, Hindus, Egyptians, Japanese, Phoenicians, Persians and Greeks who applied several physical agents for treatment of disease conditions (i.e. Physiotherapy) and instituted the Art of body movements (i.e. Physical Exercise) and massage as curative procedures (Owoeye, 1990).

**THE BRIDGE BETWEEN THE CRUDE AND THE SCIENTIFIC SYSTEMS IN PHYSIOTHERAPY**

For an undetermined period of time that lasted several centuries, the practice of physiotherapy lacked scientific rationales. Indeed, outstanding therapeutic responses, i.e. positive effects were obtained following the crude procedures of physiotherapy but the questions of why and how could neither be answered nor explained. In fact, at that very early period, no one dared ask WHAT? WHY? And HOW? At that early time also there was nothing like specialty. The same person at that time did all that was humanly possible to relieve human pains.

Then came a period of time in not too distant past when various specialties in physiotherapy started to emerge. For example Electrotherapy, a major area of specialization in physiotherapy started as far back as 600 B. C. by Thales of Miletus, the

Chief of the Seven Sages of Greece through his discovery of electrostatic charges, a physical feature that led man to the discovery of electricity. Electricity in this most rudimentary form as well as the discovered shocks from torpedo fish (i. E. electrified fish), during the time of Emperor Tiberius which were adapted for treatment formed the foundation of the latter works of Galen and Paul of Aegina (625 – 690) and William Gilbert, the father of Electrotherapy (1544 – 1603).

During that time, physiotherapy, or heliotherapy emerged as a specialty and was employed to attend to disease conditions of man. The origin of this could be traced to Aesculapius, the god of Medicine who was said to be the son of Apollo, the Sun god of the Greeks. Also, the institution of thermotherapy particularly by the Romans as effected through the seating houses is very spectacular.

Continuing this trend, it was about 500 – 400 B. C. that Iccus and Herodicus in Europe reduced the body movements into a system of exercise that could be adapted for treatment under control and the effects of which could be explained. The regularization of other physical treatment procedures or the use of other physical agents on scientific basis started to be gradually instituted from about that time (Owoeye, 1988 – 89).

Between that period of time and the most recent past, some of the physiotherapy procedures or modalities that were established on sound scientific bases include: the therapeutic application of galvanic, faradic, sinusoidal and high frequency electrical currents; generation and therapeutic application of infra-red rays, ultraviolet rays and the institution of modern procedures of Hydrotherapy, Mechanotherapy including ultrasonic energy and exercise therapy.

**CURRENT PHYSIOTHERAPY PRACTICE AND RESEARCH**

The growth and developments of physiotherapy in the past has been reviewed. As an appraisal physiotherapeutic management was in crude from without any scientific rationale. Later, the place of physiotherapy gained prominence particularly during the

world wars. The war turn heroes were beneficiaries while at a later period, physiotherapy became luxurious treatment for the nobles, the Lords, Kings, Queens and very high Princes and Princesses. History, when objectively recorded is extremely fascinating. Today is the future of the yester-years. In other words, today is current and of course is the present period of our generation. A bridge, as earlier on referred to, linked the past to this methods and in fact it was the age of scientific enquiries when questions such as WHAT? WHY? And HOW? were openly asked.

**PHYSIOTHERAPY TODAY.**

Today, the practice of physiotherapy is on very sound scientific bases. There is a scientific rationale for every bit of clinical practice in physiotherapy that can be explained, discussed and subjected to evaluation. Volumes of books and books now exist in physiotherapy. Also existing today are numerous Monographs, Newsletters, Official Communication Booklets, Magazines and Journals in physiotherapy worldwide. Very many eminent researchers in physiotherapy now operate or perform in several renewed laboratories and research centers world-wide. Today, as a matter of fact, a body of knowledge in the Arts and Sciences of Physiotherapy now exists. Today in different countries, different lands and in all the continents of the world including Africa are several fully-fledged professors of physiotherapy. It is on record of course that today we have physiotherapy professors who are Deans of Faculties, Deputy Vice Chancellors and Vice Chancellors of Universities.

In all the civilised countries of the world today, physiotherapy is a constituent of all the existing comprehensive health care systems. In other words, the health care delivery system in any Hospital remains incomplete without the facilities in physiotherapy. Within a hospital set up, virtually all the patients in attendance, i.e as either patients on admission or patients attending as day cases, have some form of benefits to derive from physiotherapy. For example, virtually every surgical patient on admission in any hospital requires some form of physiotherapeutic procedures. This is in the form of pre- and post-surgical operative physiotherapy. Most of the medical patients who are on the hospital

beds also require some form of physiotherapy. Long after their discharge from the hospital beds, many of these patients, most often, need to continue to attend for physiotherapy as day cases. Several other patients attend physiotherapy out-patient departments for treatment or medical rehabilitation of innumerable conditions that do not require hospitalization.

Today, virtually every living man or woman either sick or apparently healthy either in hospitals or in their own homes can physically benefit from some procedures in physiotherapy. Even those that are said to be perfectly healthy need to maintain the level of their health through some procedures in physiotherapy. As age advances, some deteriorations do occur in human anatomy. With increasing age also, there are changes in the chemistry and physiology of the human body. In order to ameliorate these changes or offer prevention and to relieve pains, the therapeutic application of certain procedures in physiotherapy become essential and necessary.

Today, therefore, the practice of physiotherapy has gone beyond the hospital walls. That is, physiotherapy is now practiced extensively in the community: in the urban, rural and remote rural areas. The industries are not left out. Of course, physiotherapy is, today, practiced in institutions including schools and colleges, in Rehabilitation Centres, Homes for the elderly etc. Hence, in the civilized and advanced countries of the world today, each family engages the services of a family physiotherapist.

In addition to the above areas of practice, Physiotherapy, today, has prominent roles in the management of clinical emergencies. Some of such clinical emergencies include:

1. Respiratory infections;

2. Defective and degenerative lumbar intervertebral discs resulting in acute low back pains;

3. Soft tissue injuries such as contusions, soft tissue ruptures, ligamentous and tendinous injuries;

4. Joint injuries such as subluxation, dislocation, sprains, strains, etc;

5. Surgical operations, either those planned or the ones carried out in emergencies in attempts to save lives;

6. Burns as by fire or flame, hot water, hot oils, electrical or chemicals;

7. Cerebrovascular accidents or other neurological conditions of sudden onsets;

8. Pathologies of internal organs resulting in pain perception of varying degrees; and

9. Resuscitation and the management of the unconscious patients, etc.

In many of these cases, physiotherapy plays major roles while in some others the roles of physiotherapy are complementary to other nursing, medical and surgical managements.

For the enhancement of comprehensive health care delivery, the essential components of physiotherapy which are very prominent today include:

A Diagnostic Physiotherapy

B. Preventive Physiotherapy

C. Therapeutic Physiotherapy

D. Curative Physiotherapy; and

E. Rehabilitative Physiotherapy.

## DISCIPLINES IN PHYSIOTHERAPY

Over the years and up to date, various specialties in physiotherapy have emerged in order to meet up with the human needs in sickness, in pains and in man's effort to maintain his or her level of good health. Most prominent among the resulting expanded disciplines in physiotherapy today include:

1. The Basic Medical Sciences such as Anatomy, Physiology, Biochemistry, Pharmacology, Medical Psychology, Clinical Psychology, etc.

2. Patho-Kinesiology

3. Biomechanics

4. Electro-Physics

5. Medical Electronics

6. Medical Instrumentations

7. Massage of Soft Tissues

8. Manipulations of the Musculo-Skeletal System

9. Exercise Therapy

10. Orthopaedic Physiotherapy

11. Physiotherapy in Sports

12. Recreational Physiotherapy

13. Paediatric Physiotherapy

14. Neurological Physiotherapy

15. Physiotherapy in Obstetrics and Gynaecology

16. Physiotherapy in Surgical Conditions

17. Respiratory Physiotherapy

18. Cardio-Thoracic Physiotherapy

19. Physiotherapy in Geriatrics

20. Physiotherapy in Psychiatrics

21. Physiotherapy in Industrial Injuries and Accidents (i.e. Physiotherapy in Industries)

22. Community Physiotherapy

23. Physiotherapy in Physical Fitness, etc.

**CURRENT TREND OF RESEARCH IN PHYSIOTHERAPY**

The only means of building up or adding to the body of existing knowledge is through research. Also, the only means of improving the effectiveness of the clinical procedures in the treatment of pathological conditions or medical rehabilitation or in keeping physically fit is through the application of research findings. Equally, the only means by

which the treatment modalities or the monitoring or the assessment instruments can be expanded or increased is through research. It becomes very obvious therefore, that the credibility of a profession and the maintenance of her status quo among other professions in the academic and clinical communities depend largely on how much research is done and how much of the research findings are utilized or applied to an advantage.

The major areas of focus in the current physiotherapy research studies include:

1. Neuromuscular Re-education

2. Musculoskeletal Re-education

3. Cardiovascular Rehabilitation

4. Cardiorespiratory Rehabilitation

5. Management of Acute ad Chronic Pains

6. Kinesiological and Biomechanical Studies of the body segments in normal and pathological conditions.

7. Energy Cost in Ambulation

8. Wound Healing, both Chronic and Traumatic etc.

The methodology of a great deal of these research studies is mainly clinical investigations which are either case reports or exploratory in design. Only a very few of the research studies are experimental in design. Also, basic research studies in physiotherapy are very scanty.

In research studies involving Neuromuscular, Neurological and Musculoskeletal Re-education and Rehabilitations, the most current legitimate tools or instruments commonly in use in physiotherapy include:

1. Electomyographic Biofeedback Machines: For management and monitoring of neuromuscular activities.

2. The Cybex Digital Work Integrator, an Isokinetic System: For exercising, testing and research in disease conditions or injuries of the Musculoskeletal System and for Physical Exercise or Athletics Training;

3. Kinetron: For effective isokinetic exercise and Physical training;

4. Orthotron: For isolated joint rehabilitation, that is, for rehabilitation of the injuries involving the knee, ankle and shoulder joints, etc.

With respect to research in these instances, the immediate and remote benefits of such studies are to prevent the instrument's misuse and under-use and thus attempting to place the instruments within sound therapeutic rationale.

As for studies in Cardiovascular and Cardiorespiratory Rehabilitation and Training, the current modalities or instruments in use by physiotherapists include:

1. The Bicycle Ergometer

2. The Tread Mill

3. The Spirometer and the automatic gas analyzer

4. A twelve lead Electrocardiograph

5. Electronic instruments for measurements of blood pressure and the heart rate etc.,

These instruments can be used directly or adapted for rehabilitation, monitoring and assessment of cardiac patients. They can also be used for athletic performance, training and physical training or for physical fitness. Some of the problems receiving the attention of current researchers, just to cite few examples, include:

(a) To determine if breathing exercises can increase the vital capacity; and

(b) To determine the oxygen consumption, heart rate and blood pressure in response to calisthetic exercise designed for convalescing cardiac patients.

In research studies involving the management of acute and chronic pains of the human musculoskeletal system, one of the current instruments in use in physiotherapy is Transcutaneous Electric Nerve Stimulation Device (TENS). With this equipment, i.e. TENS, the problem which the researchers are trying to solve is the determination of the effectiveness of this equipment (i.e. TENS) in relieving acute pains in the following cases of clinical emergencies:

1. Post-operative pains such as may occur in abdominal incisions;

2. Traumatic ligamentous or tendinous injuries;

3. Fracture of ribs;

4. Labour pains; etc

The other findings, which are still subject of on-going research are that the electrical impulses from this equipment (i.e. TENS) block or reduce the amount of pain information being passed on to the brain. It is also hypothesized that the impulses from the TENS excite the production of the body's natural pain reducing substance. These

endogenous substances, which are the Endorphins and Enkephalines are said to have the effects of diminishing the sensation of pains (Snyder, 1977 & 1980; Simon and Hiller, 1978; Blom and Segal 1980).

Another modality most recently discovered to be very effective in relief of pain is the laser beam. Recent medical and physiotherapy literature indicate that the therapeutic effect of the laser beam in the relief of focal point of pain is dramatic. The problem receiving the attention of the researchers on the laser beam is the determination of the safety of this modality as well as to identify any possible detrimental side effects.

In Kinesiology and Biomechanics, some of the problems currently receiving the attention of researchers include:

(a) Finding the relationship between vertically perception and body balance as influenced by perceptional styles, age and sex; and

(b) Determination of the isometric torques produced at specific joints or specific body segments using Cybex II and adaptation of the beneficial resultant effects for therapeutics. Some other problems being investigated is the determination of the energy expenditure during ambulation for instance:

    (i) In ambulation with walking aids, using different gaits; and

    (ii) In ambulation of amputees; either unilateral or bilateral below-knee or above-knee amputees with or without prostheses at fast, slow and free cadence.

In wound healing, some of the problems being investigated include:

(a) The effect of intermittent compression as well as weight reduction on healing of chronic ulcers.

(b) The effect of galvanic current stimulation following traumatic soft tissue injuries (Owoeye, *et al*. 1987).

(c) The effects of some radiations, for example, infrared and ultra-violent radiations on wound healing, (Owoeye and Adeyemi-Doro, 1995).

**OTHER AREAS OF RESEARCH**

Other areas of current research activities in physiotherapy include investigations into the effective physiotherapeutic management including medical rehabilitation of some disabling pathological conditions such as:

1. **Neuromuscular Disease,** e.g.
   (a) Guillain Bare syndrome
   (b) Pseudo – Hypertrophic Muscular Dystrophy, i.e. Duchenne's muscular dystrophy.
   (c) Erb's Juvenile Muscular Dystrophy
   (d) Facio-Humero Scapular Muscular Dystrophy, etc.

II. **Osteomyelitis,** e.g.
   (a) Acute Haematogenous Osteomyelitis
   (b) Acute Suppurative Arthritis
   (c) Acute Septic Arthritis in Infants, etc.

III **Tuberculosis of Bones and Joints,** e.g.
   (a) Tuberculous Osteitis
   (b) Tuberculous Synovitis
   (c) Pott's Disease, etc.

IV **Orthopaedic Diseases**

(V) **Neurological Conditions** e.g.

(a) Spinal Bifida

(b) Hydrocephalus

(c) Anencephaly

(d) Cerebral Palsy

(e) Multiple Sclerosis

(f) Friedreich's Ataxia

(g) Obstetric paralysis

(h) Meningitis / Encephalitis

(i) Neonatal Tetanus

(j) Poliomyelitis

(k) Spinal Cord Lesions

(l) Polyneuropathies

(m) Peripheral Nerve Injuries, etc.

(VI) **Congenital Deformities,** e.g.

(a) Congenital Talipes

(b) Torticollis

(c) Sprengel's Shoulder

(d) Congenital Dislocation of the Hip.

(VII) **Acute and Chronic Respiratory Diseases, etc.**

This speaker (i.e. this author) in recent time has either carried out some research studies into some of the above conditions or supervised the research studies by some junior professional colleagues on many of those conditions.

## PUBLISHED BOOKS AND MONOGRAPHS

Between 1985 and 1995, Owoeye successfully published seven books and monographs in Physiotherapy. Notable among these is "*The Oath of Physiotherapy Practice"* (Owoeye, 1995; Owoeye, 1990) the first of its type in the whole world. Under inspiration, this all important and historical document was written in 1983. As usual it was subjected to discussions and debates at the various levels of the national professional body of physiotherapy in Nigeria. The Governing Council of the Nigeria Society of Physiotherapy finally approved in 1984. This approval was communicated on November 19, 1984. Besides the use of this document in all the higher institutions of learning in Nigeria, it has since become a reference document that is also used World Wide.

Considering the problem of how Physiotherapy facilities could be made available to all the members of the communities world-wide, Owoeye led a small group of committed physiotherapists to conduct a national Workshop on "Community Physiotherapy" at the Premier University Teaching Hospital in Ibadan, Nigeria in 1986. Shortly after (i.e. also in 1986), a book titled "Community Physiotherapy" was edited and produced by Owoeye, Sanya and Aigbogun. Again, this book which is the first of its type has a world-wide circulation. These books and Monographs that were produced by this speaker include:

1. OWOEYE, I. O. (1985): The Oath of physiotherapy Practice.
2. OWOEYE, I. O. (1985): The Ceremony of Formal Admission to membership of the Nigeria Society of Physiotherapy.
3. OWOEYE, I. O. (Ed.) (1986): Nigeria Society of Physiotherapy at 25.
4. OWOEYE, I. O.; SANYA, A. O. and AIGBOGUN, O. B. (Eds.) (1986); Community Physiotherapy.
5. OWOEYE I. O. *et al.* (1987): Contributed a chapter titled: "Uses of pused Electrical Stimulation for Tendon Healing" in a voluminous textbook of surgery titled: "Tendon surgery in the Hand published by C. V. Mosby company (1987) in the United States of America.

6. OWOEYE, I. O. (1990): The Oath of physiotherapy Practice and Oaths of Offices.
7. OWOEYE, I. O. (1993 – 1995): Editor-In-Chief for the "Journal of the Nigeria Society of Physiotherapy"
8. OWOEYE, I. O. (Ed.) (1995 up to date): The Nigeria Medical Rehabilitation Therapist Bulletin.
9. OWOEYE, I. O. (Editor-In-Chief) (1996 up to date): Journal of the Nigeria Medical Rehabilitation Therapists (JNMRT).

*NB:* Two editions of this journal are produced each year i.e. June and December Editions.

**NEWS MEDIA**

In rendering Health Services to the Nigeria citizens, Owoeye participated very actively by making presentations on varieties of Health problems on NTA Channel 10 programmes of "Health Professionals" in the Eighties and early Nineties. At that same time, Owoeye happened to be a columnist for a Health news Paper, "The Life Mirror" writing on varieties of health problems to enlighten and educate the Nigerian citizens on the roles of physiotherapy on preventions, physical management and Medical Rehabilitation on those health problems (Illustrations on Slides).


**THE TREND OF RESEARCH STUDIES IN PHYSIOTHERAPY BY THIS AUTHOR**

As a scientist in the theoretical base and the clinical practice of Physiotherapy, Owoeye has delved into multi-various research activities in physiotherapy dating as far back as 1973 at the University College Hospital, Ibadan in Nigeria. Ever since, the research

ventures of this author has taken him to other institutions such as the Long Island University, New York, U. S. A.; New York University Medical Centre, New York, U. S. A. College of Medicine, University of Lagos, Lagos, Nigeria; Lagos University Teaching Hospital, Lagos, Nigeria and some other research centers in Nigeria and aboard. His research reports as published in reputable and recognized journals in Nigeria and abroad are very familiar to physiotherapists worldwide.

Over the years, Owoeye has been able to achieve a variety of scientific and physiotherapeutic break-throughs as he shifted his scientific attention from one area of need to another. Time and space cannot allow a presentation of the reports of over one hundred research projects he successfully executed. Just to cite few examples: Over 1973/1974 at the University College Hospital, Ibadan, Nigeria, Owoeye's focus was on the incidence, prevention, management and rehabilitation of Congenital Deformities of the Foot, specifically congenital Talipes Equinovarus. The research studies initiated and pioneered by him, resulted in a clinical break-through that was demonstrated in the successful management of this condition by physiotherapeutic procedures, (Owoeye, 1992), (illustrations: Figures 1- 15).

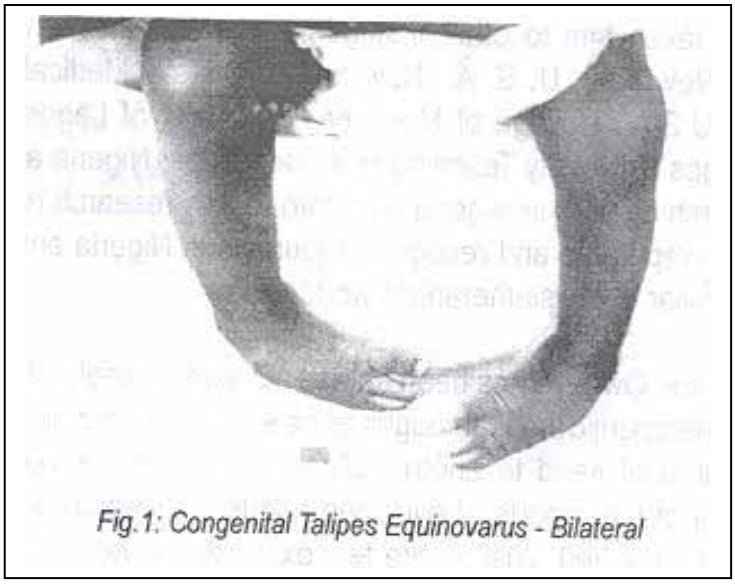


*Fig.1: Congenital Talipes Equinovarus - Bilateral*

Fig.2: Congenital Talipes Equinovarus - Unilateral

Fig.2b: Congenital Talipes Equinovarus - Bilateral

Fig.3a: The X-Ray Film of both Legs and both Ankles

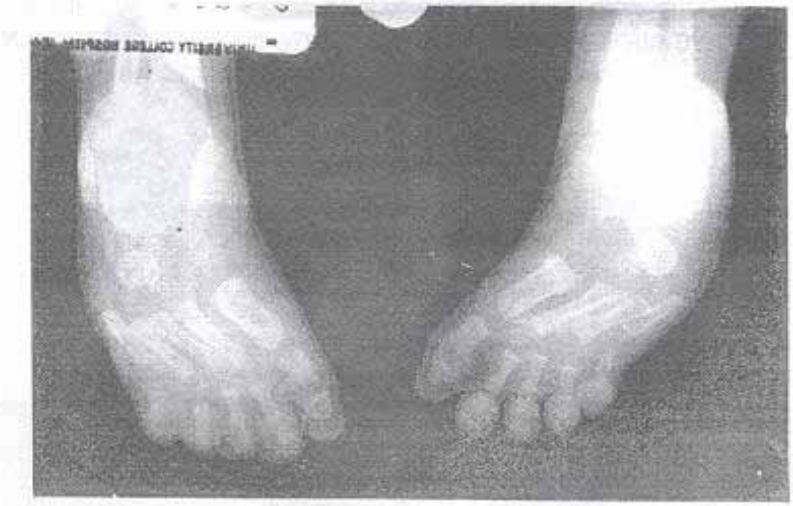


Fig.3b: The X-Ray Film of both Feet

Fig.4: Manipulative Therapy

Fig.5: Manipulative Therapy - Close View

Fig.6: Congenital Talipes Equinovarus: Adhesive Strapping

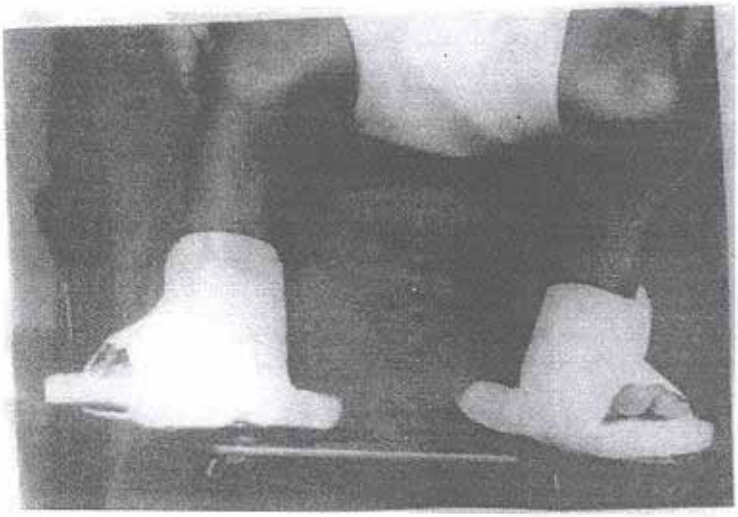


Fig.7: Denis Browne's Splinting of a Unilateral Congenital Talipes Equinovarus

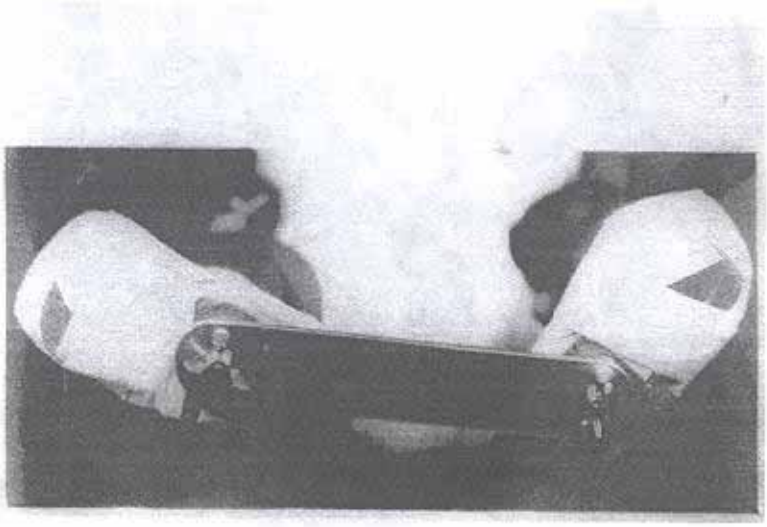


Fig.8: A Planter View of Denis Browne's Splinting

Fig.9: Denis Browne's Splinting of a Bilateral Congenital Talipes Equinovarus

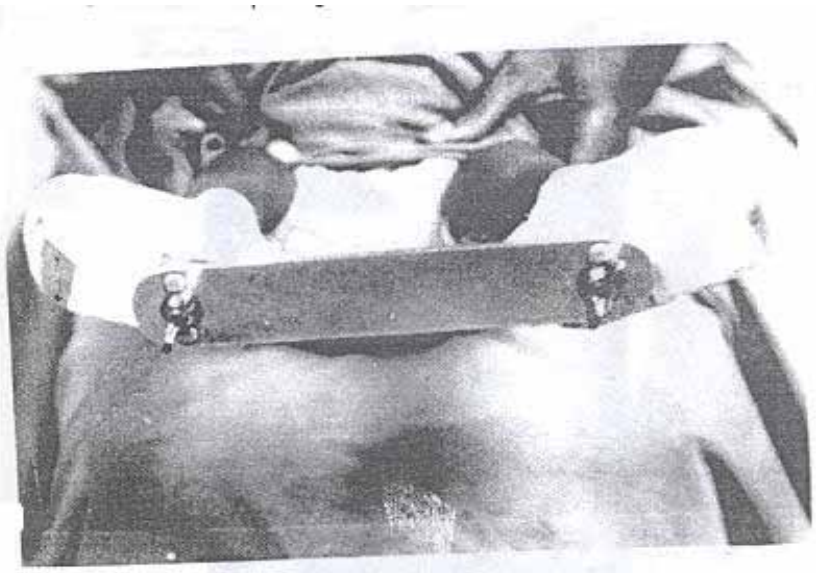


*Fig. 10: A Plantar View of Denis Browne's Splinting of the Bilateral Congenital Talipes Equinovarus*

*Fig. 11: Plaster of Paris Casting for Patients of Congenital Talipes Equinovarus (C.T.E.V.) of Age: One Year and Above*

Fig.12: Plaster of Paris Casting for Patient of C.T.E.V. of Age: Below One year

Fig.13: Wedging of the Plaster Cast to Effect Manipulation and Further Casting

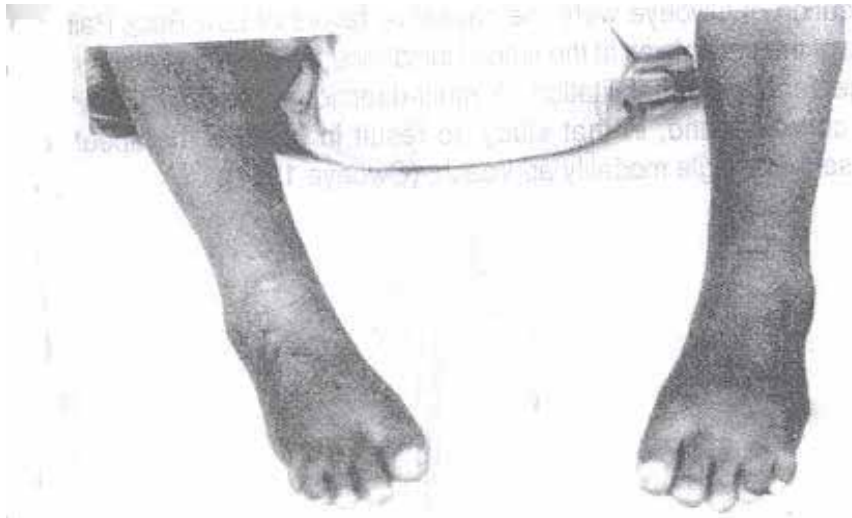


*Fig.14: Clinical Picture of the Affected Feet Mid-Way During Physiotherapy*

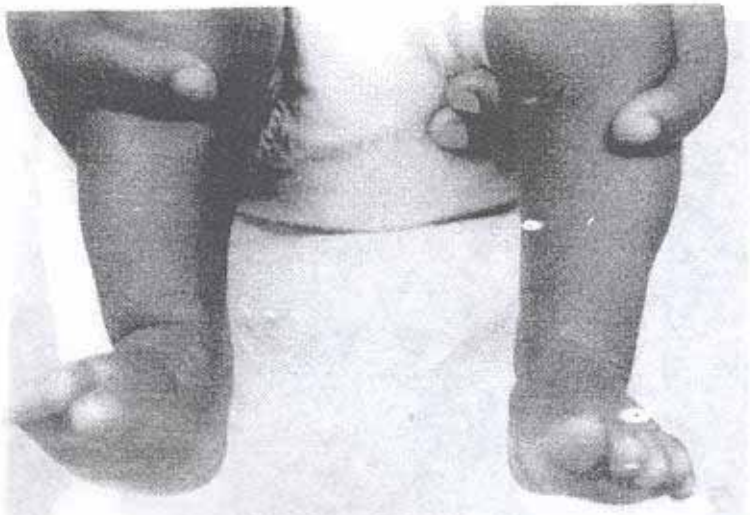


*Fig.15: Clinical Picture of the Affected Feet (C.T.E.V.) at abour Discharge from Physiotherapy.*

In 1978/79 at the Department of Medical Rehabilitation of the Kingsbrook Jewish Medical Centre, New York, U. S. A., the problems that received the attention of Owoeye were the causative factors of Low Back Pain, the age of the patients as at the time of incidence, physical assessment, management and rehabilitation. A multi-directional physical therapy approach was found, in that study, to result in positive therapeutic response than single modality approach, (Owoeye 1984).

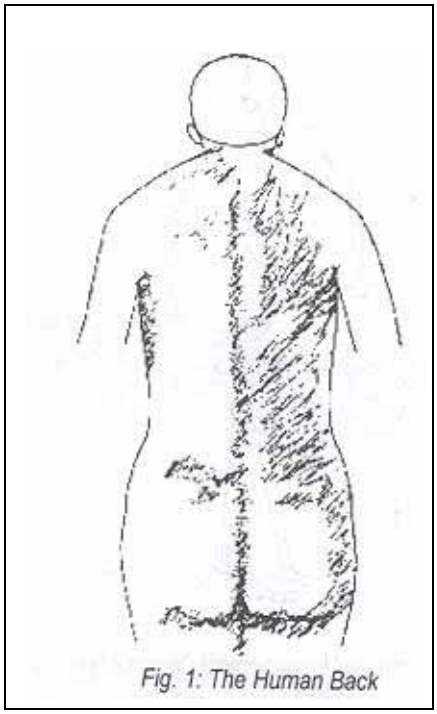


Fig. 1: The Human Back

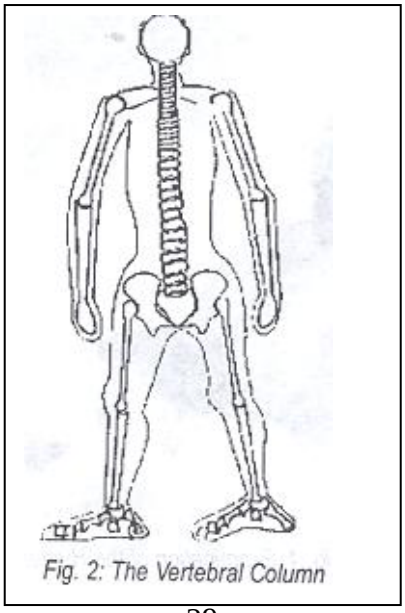


Fig. 2: The Vertebral Column

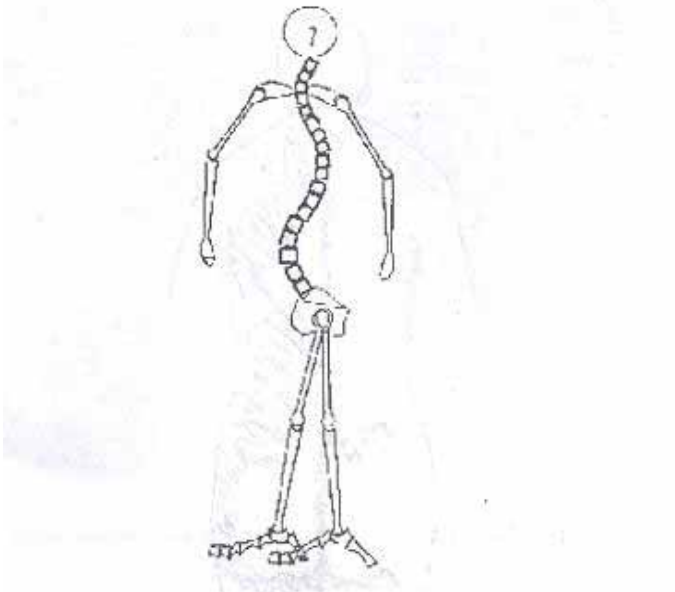


Fig. 3: The Natural and Physiological Curves of the Vertebral Column

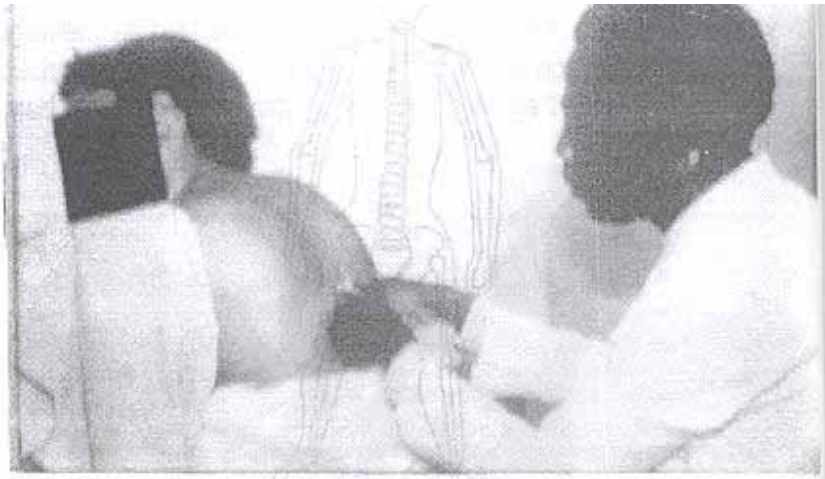


Fig. 4: Examination of the Human Back

Fig. 4b: Examination of the Human Back

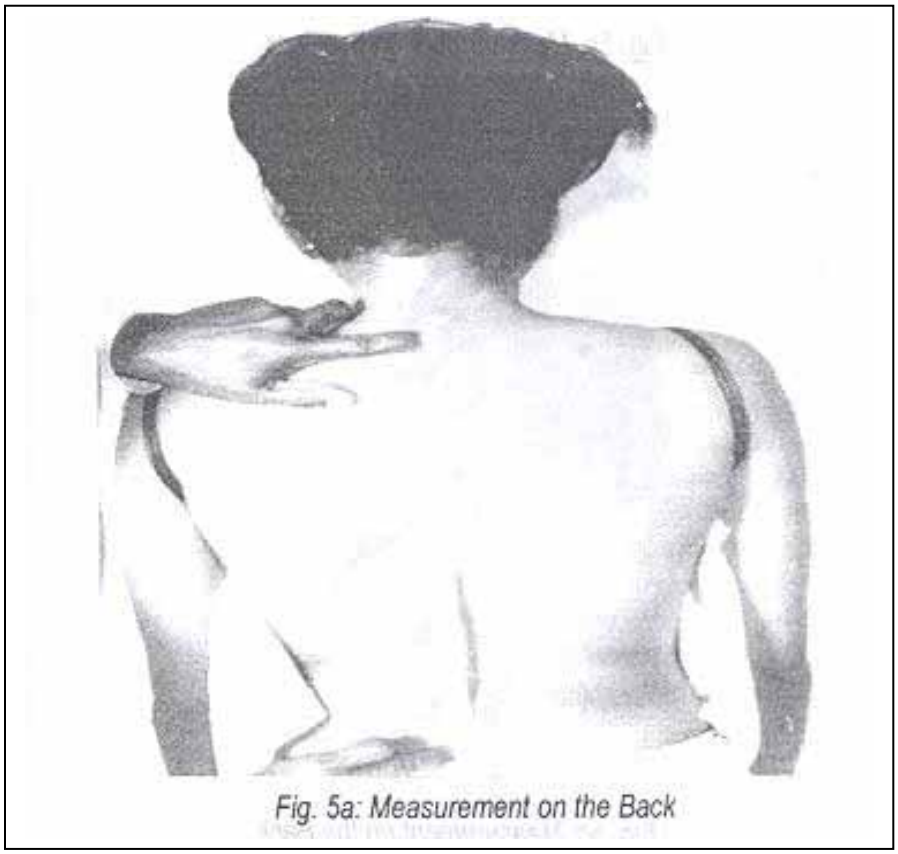


Fig. 5a: Measurement on the Back

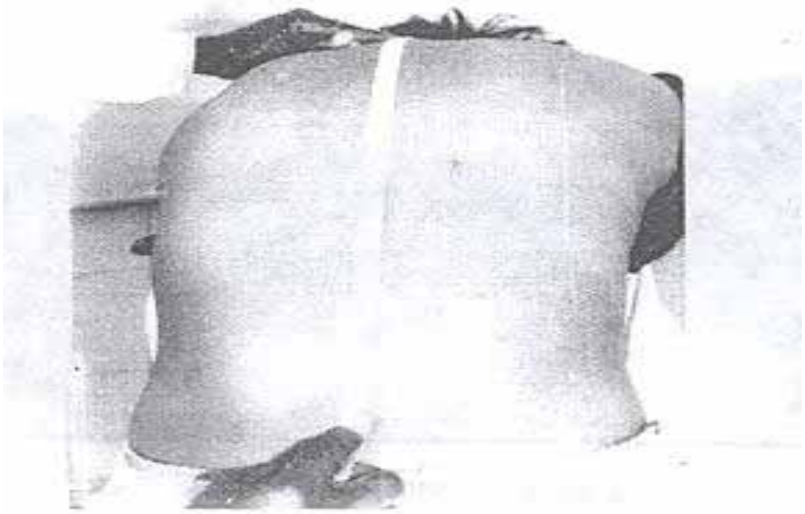


Fig. 5b: Measurement on the Back

Fig. 5c: Measurement on the Back

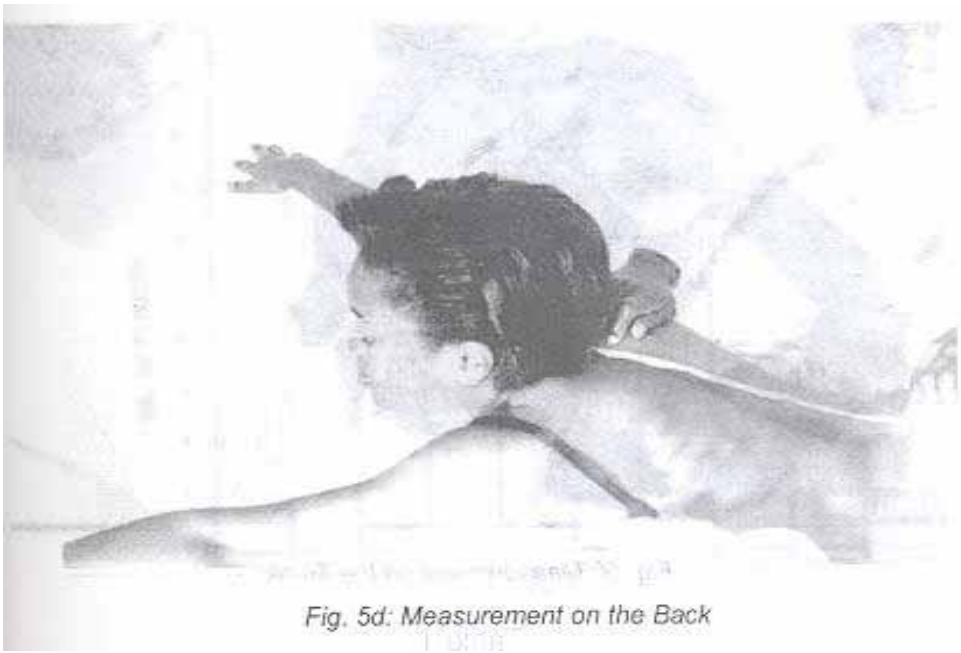


Fig. 5d: Measurement on the Back

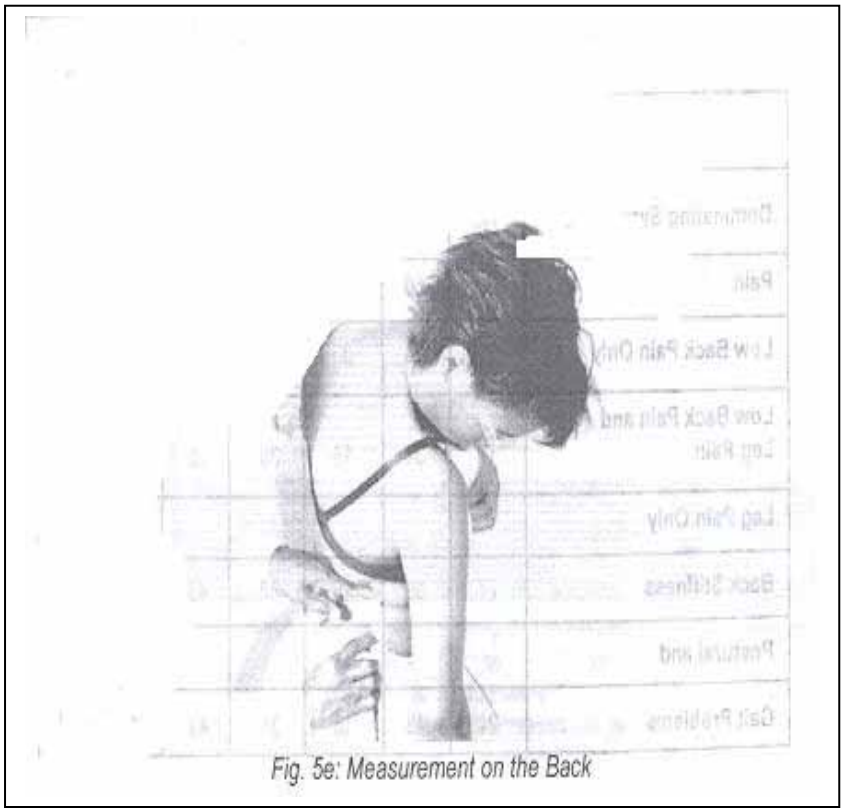


Fig. 5e: Measurement on the Back

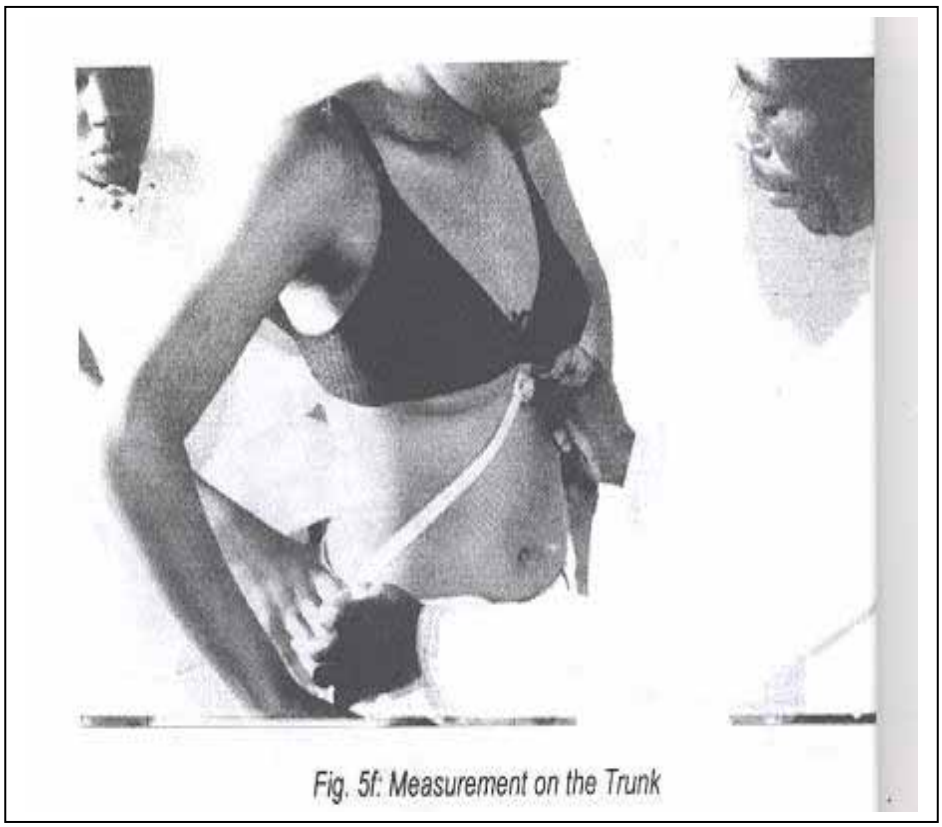


*Fig. 5f: Measurement on the Trunk*

**TABLE 1: DOMINATING SYMPTOMS**

| | MALE | | MALE | | TOTAL | |
|---|---|---|---|---|---|---|
| Dominating Symptoms | No | % | No | % | No | % |
| Pain | 30 | 60 | 20 | 40 | 50 | 100 |
| Low Back Pain Only | 12 | 24 | 3 | 6 | 15 | 30 |
| Low Back Pain and Leg Pain | 17 | 34 | 18 | 38 | 35 | 70 |
| Leg Pain Only | | | | | | |
| Back Stiffness | 27 | 53 | 16 | 32 | 43 | 85 |
| Postural and | | | | | | |
| Gait Problems | 24 | 48 | 18 | 36 | 42 | 84 |

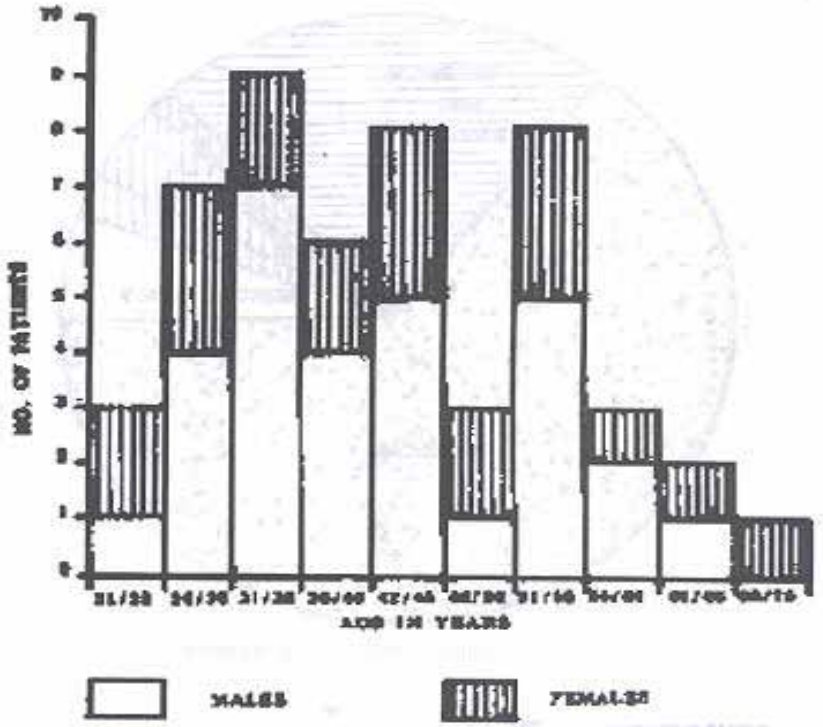


Fig. 6: Low Back Pain: A Multi-Directional Physical Therapy Approach: Age and Sex Distribution of the Patients.

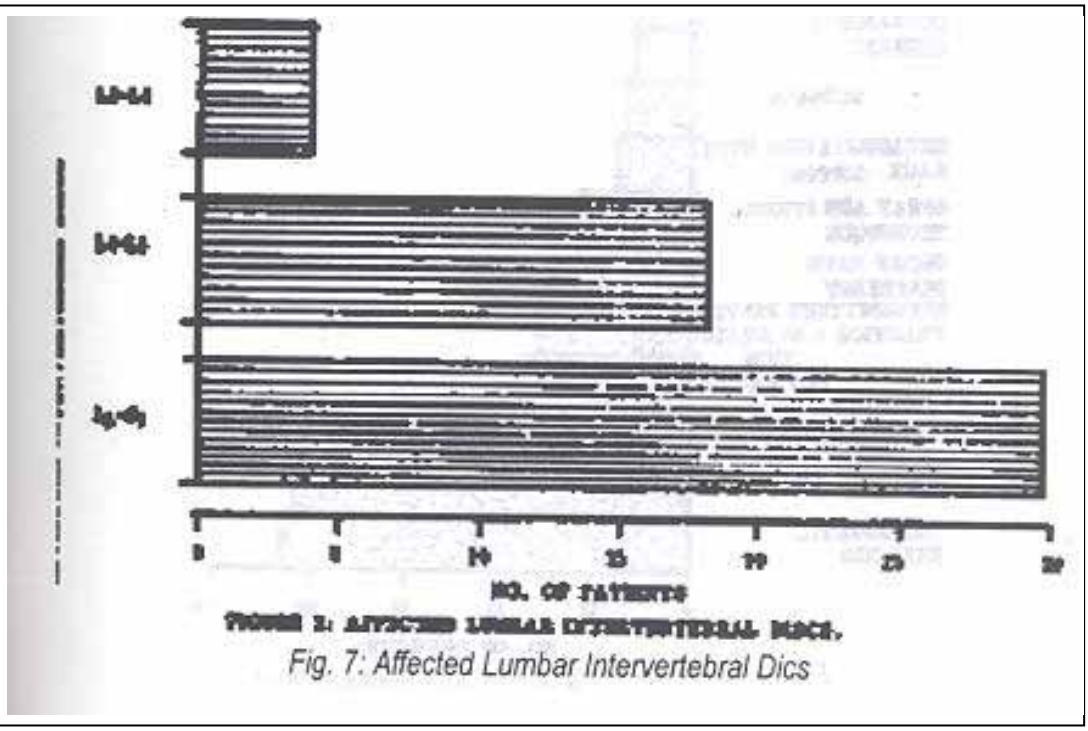


Fig. 7: Affected Lumbar Intervertebral Dics

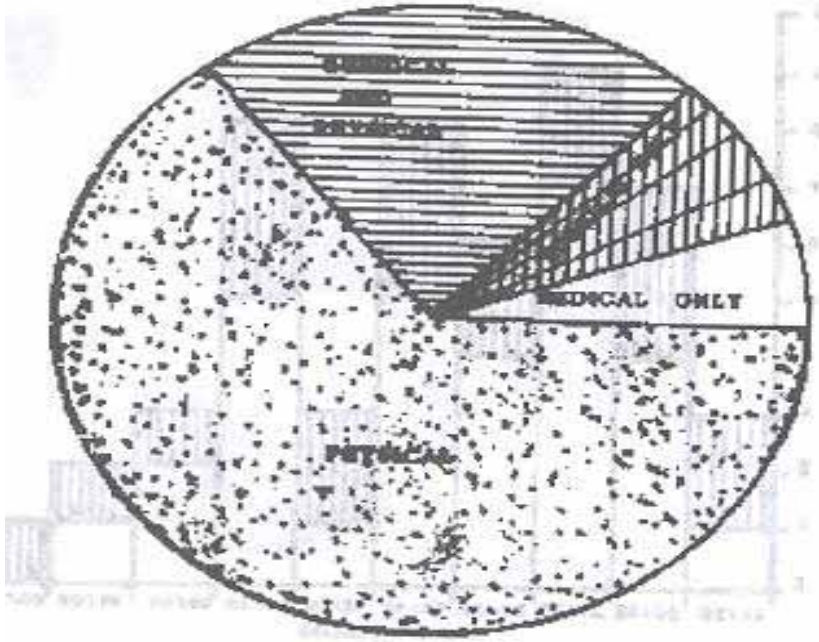



Fig. 8: Various Forms of Management

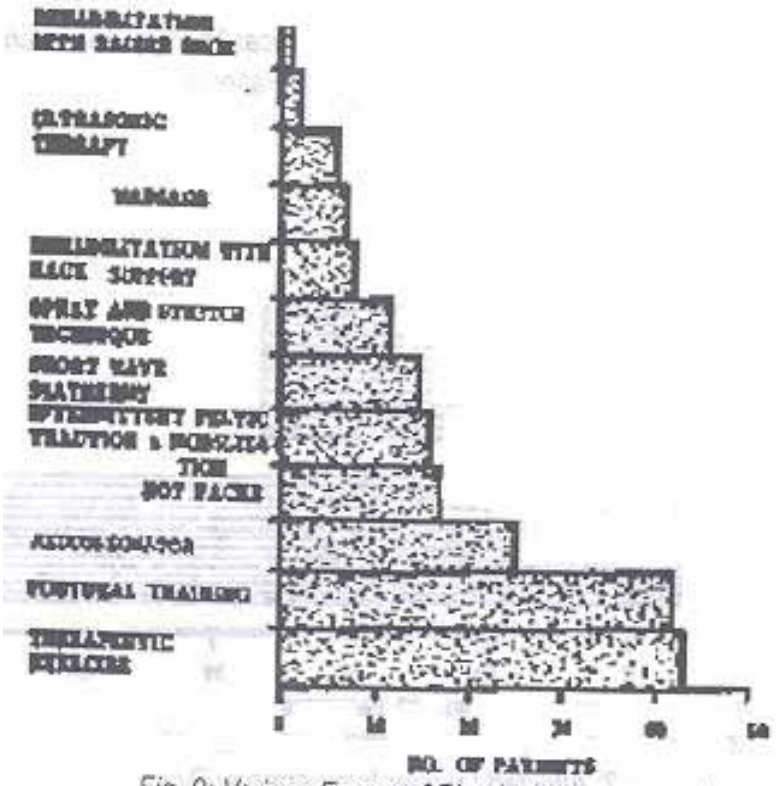



Fig. 9: Various Forms of Physical Management

**TABLE 2: ASSESSMENT OF THE RESPONSE TO TREATMENT OF BACK PAIN STATISTICAL COMPUTATION**

| Value for Comparison | Mean Values | | Standard Deviations | | 't' Statistic (p<.05) | Critical Value of "t" | Significance |
|---|---|---|---|---|---|---|---|
| | Treatment Group | Control Group | Treatment Group | Control Group | | | |
| i. Initial anterior linear flexion of the Spine | 4.94cm | 9.00cm | 1.49 | 1.22 | 7.66 | 2.145 | Significance |
| ii. Final anterior linear flexion of the Spine | 8.94cm | 9.00cm | 1.79 | 1.22 | 0.08 | 2.145 | Not Significance |
| iii. Initial lateral linear flexion to the Spine | 5.94cm | 7.38cm | 0.92 | 1.53 | 2.29 | 2.145 | Significance |
| iv. Final Lateral linear flexion to the right of the Spine | 6.61cm | 7.38 | 0.74 | 1.53 | 1.28 | 2.145 | Not Significance |
| v. Initial lateral linear flexion to the left of the Spine | 5.88cm | 7.38 | 0.65 | 1.53 | 2.54 | 2.145 | Significance |
| vi. Final lateral linear flexion to the left of the spine | 6.61cm | 7.38cm | 0.59 | 1.53 | 1.33 | 2.145 | Not Significance |
| vii. Initial angular rotation to the left of the spine | $14.38^{o}$ | $35.00^{o}$ | 7.25 | 7.50 | 5.60 | 2.145 | Significance |
| viii. Final angular rotation to the left of the spine | $20.88^{o}$ | $35.00^{o}$ | 8.38 | 7.50 | 3.62 | 2.145 | Significance |
| ix. Initial angular rotation to the right of the spine | $21.13^{o}$ | $35.00^{o}$ | 5.82 | 7.50 | 3.62 | 2.145 | Significance |
| x. Final angular rotation to the right of the spine | $21.13^{o}$ | $35.00^{o}$ | 7.13 | 7.50 | 3.79 | 2.145 | Significance |
| xi. Initial linear extension of the spine | 4.04cm | 8.31cm | 1.60 | 1.82 | 4.97 | 2.145 | Significance |
| xii. Final linear | | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| extension of the spine | 4.79cm | 8.31cm | 1.75 | 1.82 | 3.96 | 2.145 | Significance |

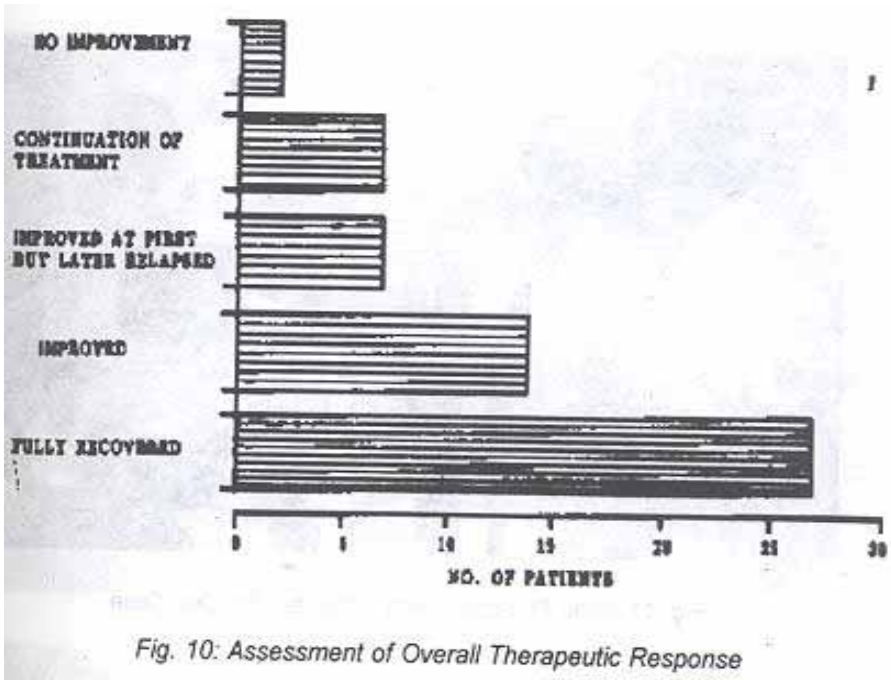


Fig. 10: Assessment of Overall Therapeutic Response

**MANIPULATIVE THERAPY**

In latter years up to the present time, this researcher has investigated more extensively, the human problem of back pains including physiotherapy at the acute and chronic states. The effectiveness of manipulations as physical management procedures were extensively investigated. The indications and contraindications for manipulative therapy of the painful back were also investigated (Owoeye 1995). Cases (i.e. cases for who manipulation is indicated) most of the time give exciting therapeutic results (illustrations: Figures 11 – 15).

Fig. 11: Inthe Process of Physiotherapy for One Case

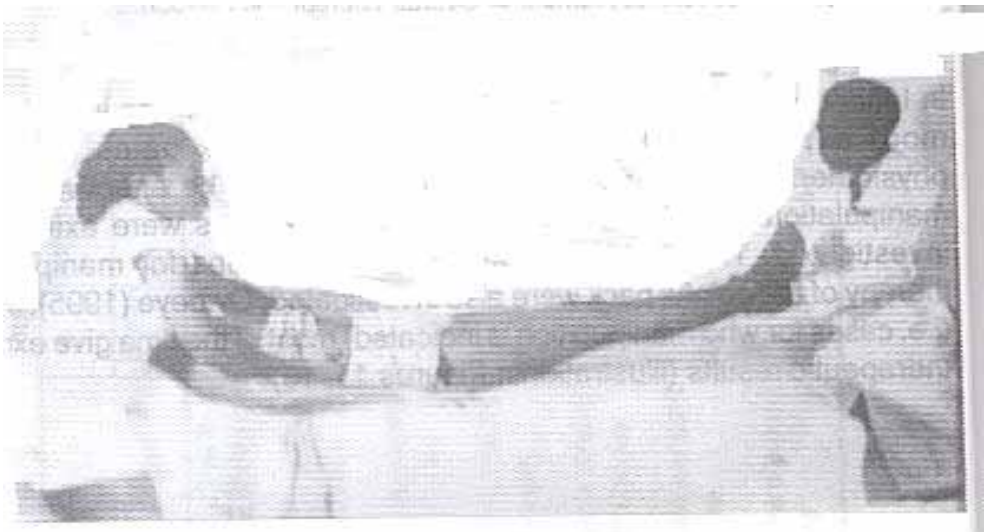


Fig. 12a: Manipulative Procedures in the Physical Management of Back Pains

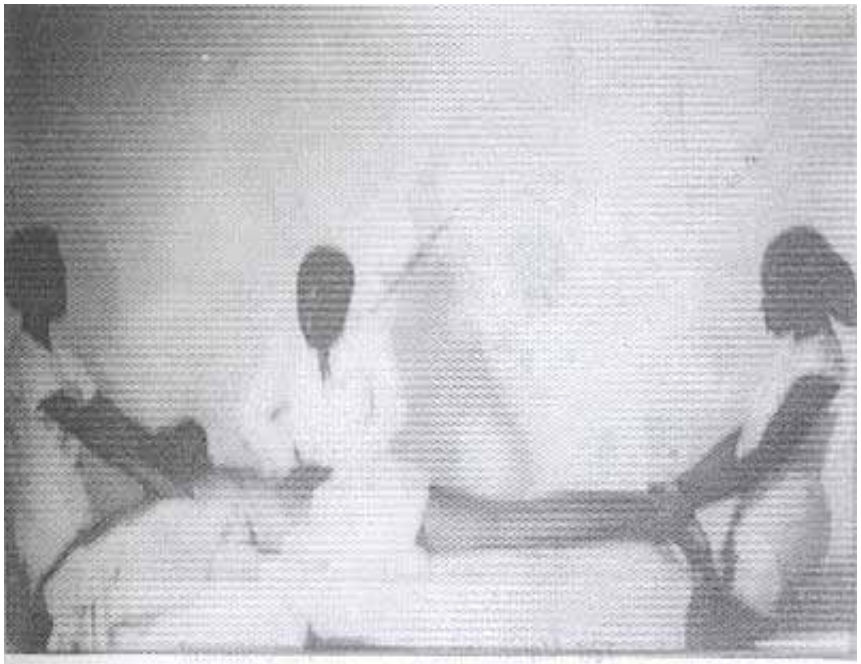


Fig. 12b: Manipulative Physical Management

Fig. 12c: Manipulative Physical Management

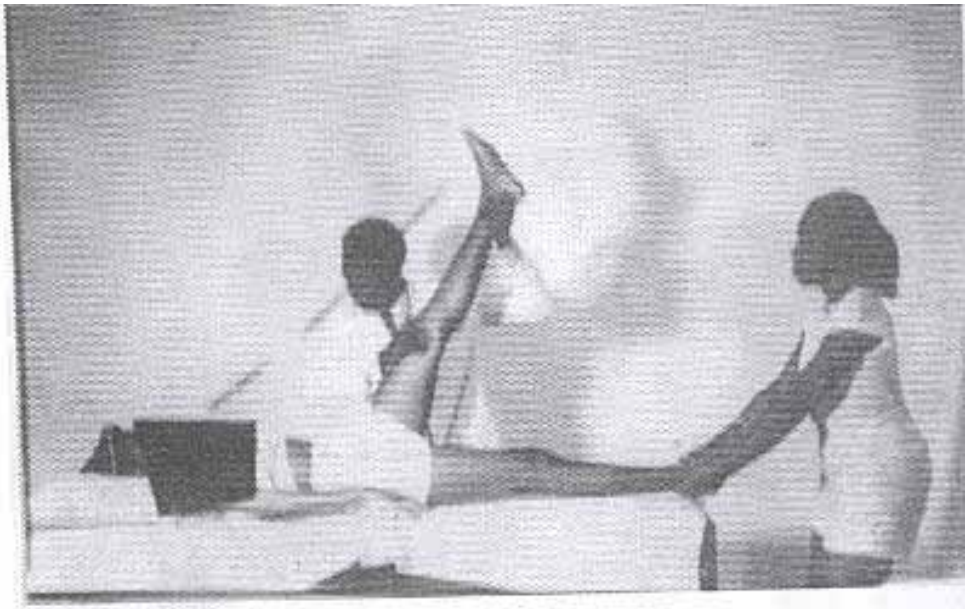


*Fig. 12d: Manipulative Physical Management*

*Fig. 12e: Manipulative Physical Management*

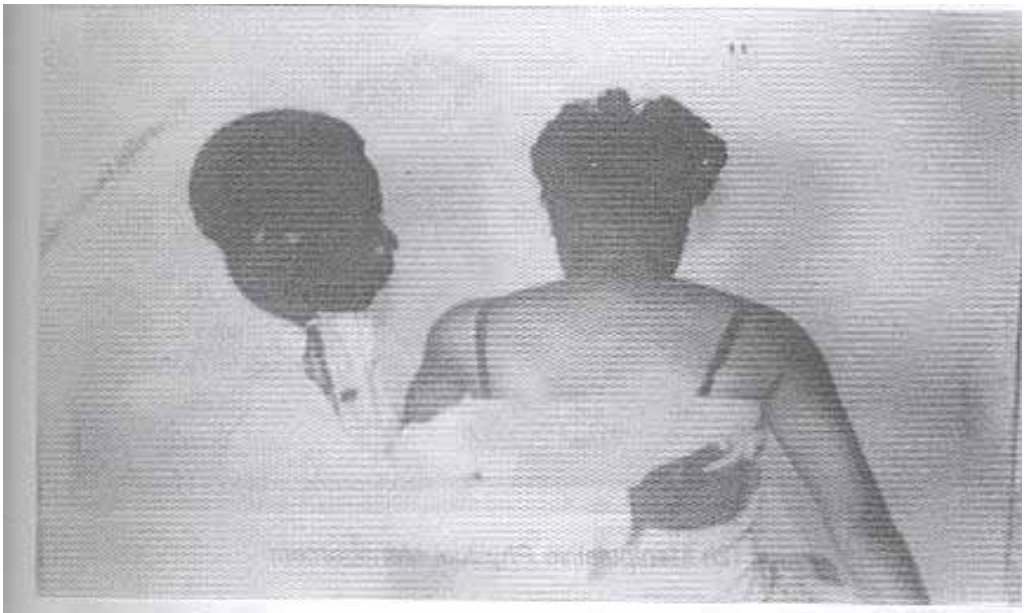


*Fig. 12f: Manipulative Physical Management*

*Fig. 12g: Manipulative Physical Management*

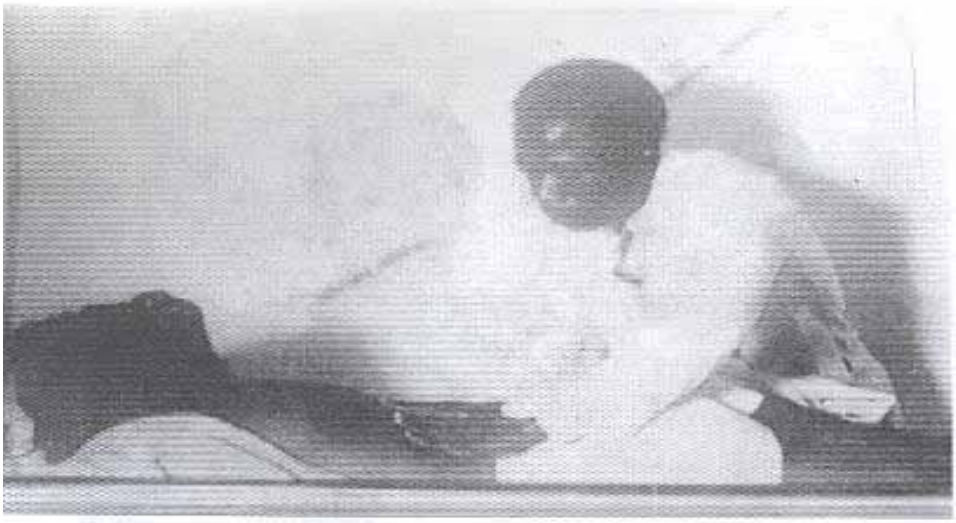


*Fig. 12h Manipulative Physical Management*

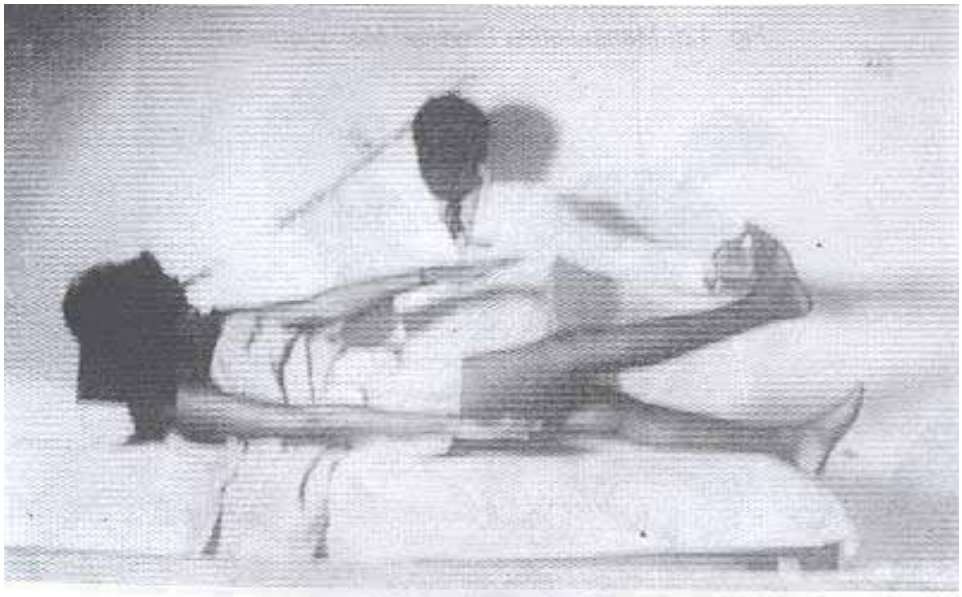


*Fig. 13a: Exercise Therapy*

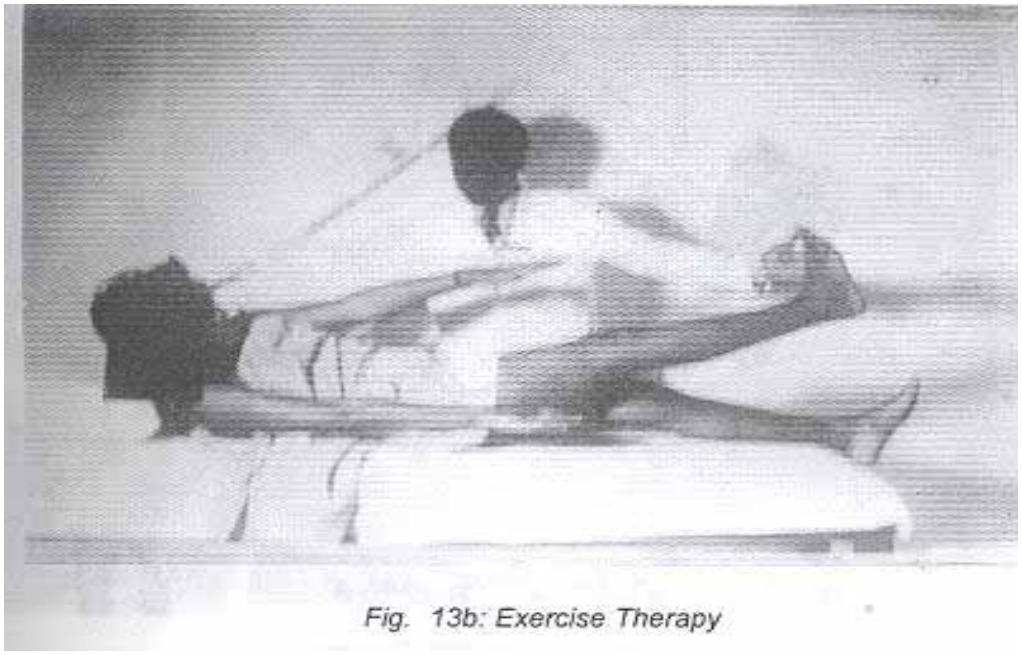


*Fig. 13b: Exercise Therapy*

*Fig. 13c: Exercise Therapy*

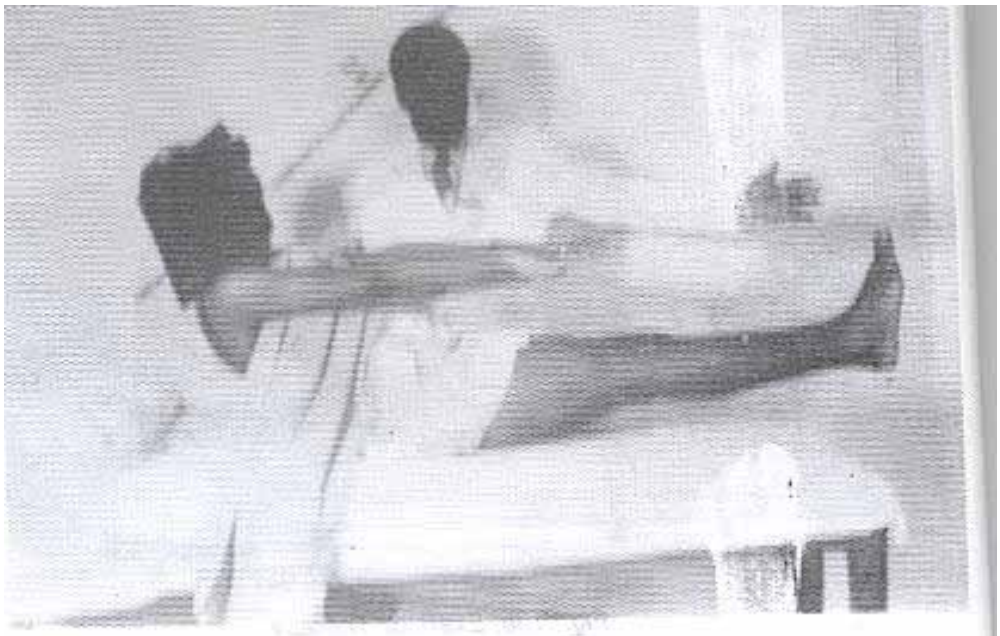


Fig. 13d: Exercise Therapy

Fig. 13e: Exercise Therapy

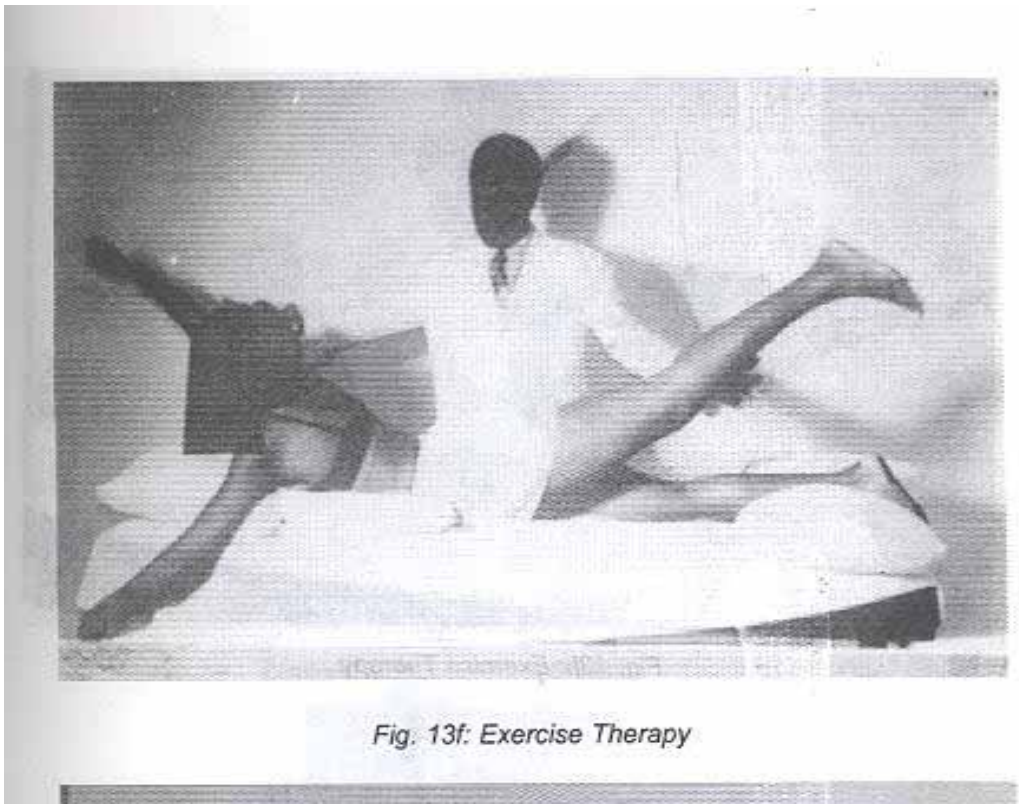


*Fig. 13f: Exercise Therapy*

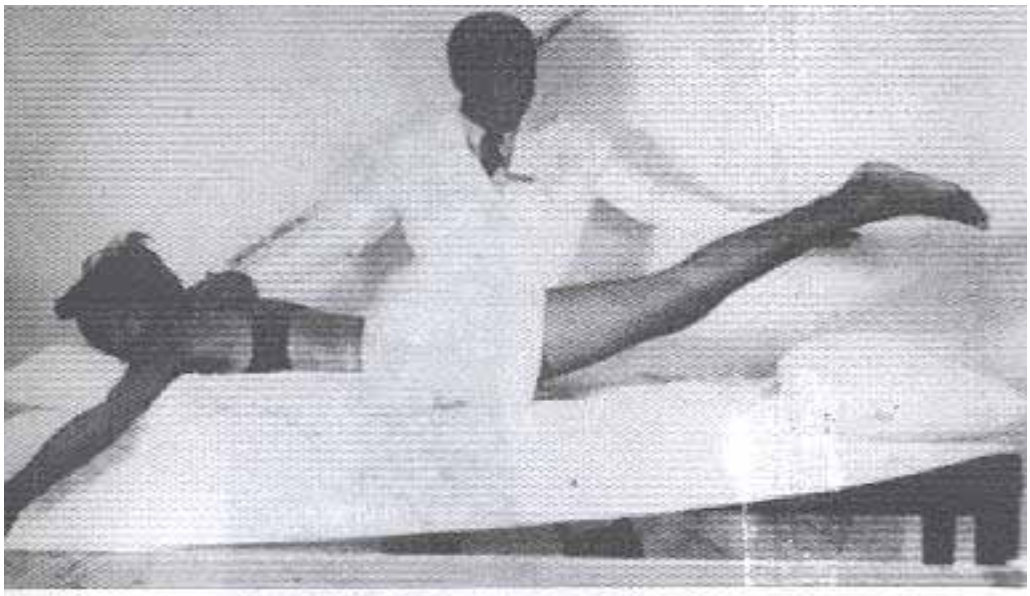


*Fig. 13g: Exercise Therapy*

Fig. 13h: Exercise Therapy

Fig. 13i: Exercise Therapy

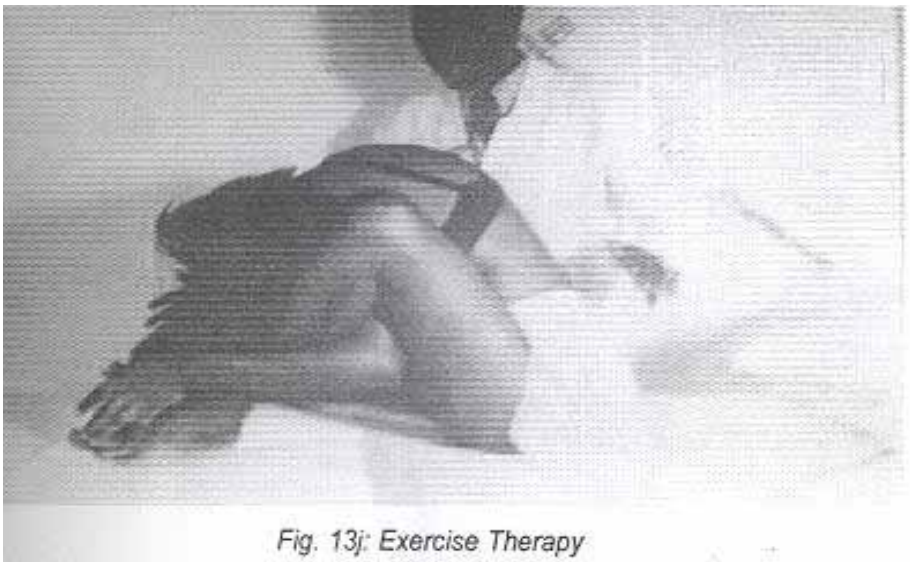


Fig. 13j: Exercise Therapy

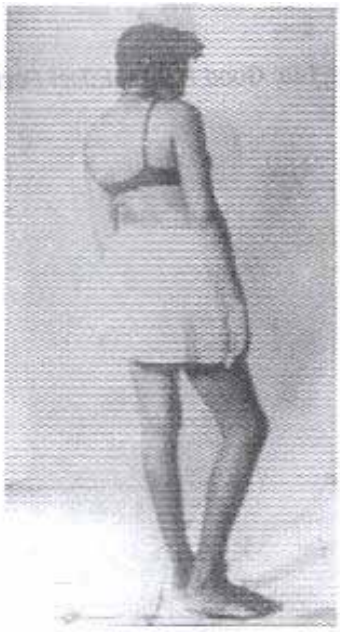


Fig. 14a: Poor Habital Effect Posture

*Fig. 14b: Good Habital Effect Posture*

*Fig. 14c: Excessively High Heel Shoes: A Causative Factor for Back Pains*

Fig. 14d: Better Shoes to Wear

Fig. 14e: Poor Sitting Posture

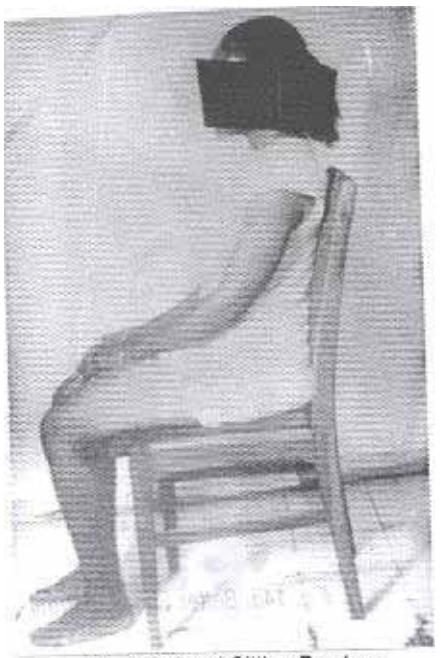


Fig. 14f: Good Sitting Posrture

Fig. 14g(i): Poor Lifting Technique

14g(ii): Poor Lifting Technique

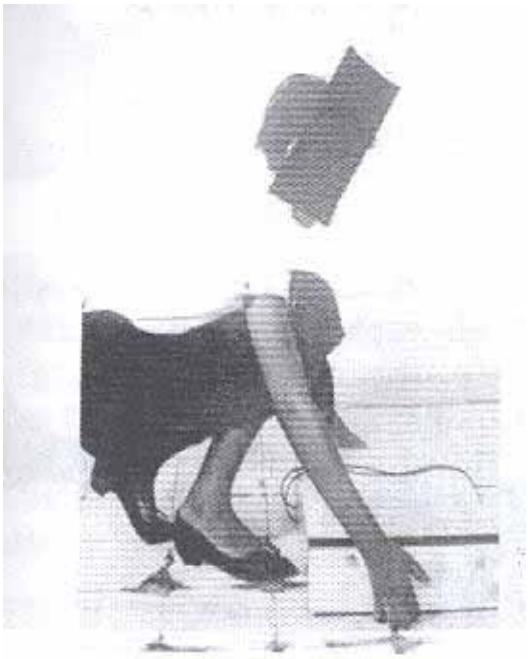


Fig. 14h(i): Good Lifting Technique

Fig. 14h(ii): Good Lifting Technique

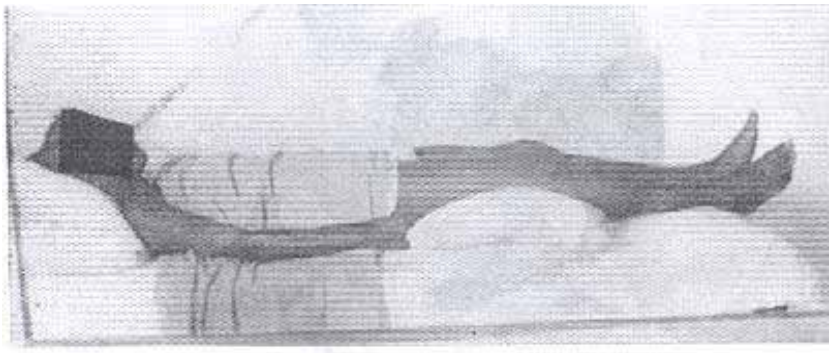


Fig. 15a: Good Sleeping Posture on the Back

Fig. 15b: Good Sleeping Posture on the Face

Fig. 15c: Good Sleeping Posture on the Lying

Also in the management of acute and chronic pains, particularly of the human back, this researcher investigated the effectiveness of Voltaren Emulgel: a non-steroidal anti-inflammatory drug by the CIBA GEIGY pharmaceutical Company, (Owoeye, 1994). The exciting result here is that the acute painful back or acute pains of the musculoskeletal system respond more positively at the shortest expected time than the chronic pains (Illustrations: Tables 1 – 6; figures 1- 7).

KEY WORDS

- DICLOFENAC
- TRAUMA
- PAIN
- PHYSIOTHERAPY

VOLTAREN EMULGEL: A NON-STERODIAL ANTI-INFLAMMATORY DRUG IN THE MANAGEMENT OF ACUTE PAINFUL CONDITIONS

By

ISAAC O. OWOEYE

**Table 1: THE SUBJECTS AND CONDITIONS SUSTAINED**

| Conditions Sustained | Number of Subjects | % of Total | % of Total |
|---|---|---|---|
| Traumatic Injuries | 75 | 75 | |
| Sports Injuries | 34 | 34 | } 75 |
| Other Traumatic Injuries | | | |
| Acute Pain Of Musculoskeletal Origin | 25 | 25 | |
| Low Back Pain | 17 | 17 | |
| Upper Back Pain | 5 | 5 | } 75 |
| Neck Pain | 3 | 3 | |

**Table 2: PAIN SENSATION BY SUBJECTS PRIOR TO TREATMENT**

| Pain Sensation | No. of Subjects | % of Total |
|---|---|---|
| Mild | 4 | 4 |
| Moderate | 34 | 54 |
| Severe | 33 | 33 |
| Very Severe | 9 | 9 |
| Total | 100 | 100 |

**Table 3: SEVERITY OF PAIN PERCEPTION PRIOR TO TREATMENT USING THE VISUAL PAIN ANALOGUE SCALE**

| Severity of Pain Perception Using The Visual Pain Analogue Scale | No. of Subjects | % of Total |
|---|---|---|
| Mild | 4 | 4 |
| Moderate | 34 | 54 |
| Severe | 33 | 33 |
| Very Severe | 9 | 9 |
| Total | 100 | 100 |

**TABLE 4: THERAPEUTIC RESPONSE TO PHYSIOTHERAPY OF TRAUMATIC INJURIES TREATED WITH AND WITHOUT VOLTAREN EMULGEL**

| | Voltaren Group | | | | Non-Voltaren Group | | | |
|---|---|---|---|---|---|---|---|---|
| No. of Days of full Recovery | Very Severe No. of Subjects | Severe No. of Subjects | Moderate No. of Subjects | Mild No. of Subjects | Very Severe No. of Subjects | Severe No. of Subjects | Moderate No. of Subjects | Mild No. of Subjects |
| 1 | | 2 | 27 | 4 | | 0 | 0 | 0 |
| 2 | | 3 | 9 | | | 0 | 0 | 0 |
| 3 | | 5 | | | | 0 | 0 | 0 |
| 4 | | 7 | 3 | | | 0 | 0 | 1 |
| 6 | | | | | | 0 | 3 | 1 |
| 8 | | | | | | 0 | 4 | 1 |
| 10 | | | | | | 0 | 4 | 1 |
| 12 | | | | | | 1 | 6 | |
| 14 | | | | | | 2 | 6 | |
| 16 | | | | | | 2 | 7 | |
| 18 | | | | | | 1 | 8 | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 20 | | | | | | 1 | 8 | |
| 22 | | | | | | 2 | 3 | |
| 24 | | | | | | 3 | 3 | |
| 26 | | | | | | 3 | 1 | |
| 28 | | | | | | 2 | 1 | |

**TABLE 5: THERAPEUTIC RESPONSE OF CASES OF SPORTS' INJURIES MANAGED WITH OR WITHOUT VOLTAREN EMULGEL**

| | Voltaren Group | | | | Non-Voltaren Group | | | |
|---|---|---|---|---|---|---|---|---|
| **No. of Days of full Recovery** | **Very Severe No. of Subjects** | **Severe No. of Subjects** | **Moderate No. of Subjects** | **Mild No. of Subjects** | **Very Severe No. of Subjects** | **Severe No. of Subjects** | **Moderate No. of Subjects** | **Mild No. of Subjects** |
| 1 | 0 | 9 | 17 | 4 | 0 | 0 | 0 | |
| 2 | | 3 | 1 | | | 0 | 0 | 0 |
| 3 | | | | | | 0 | 0 | 0 |
| 4 | | | | | | 0 | 0 | 0 |
| 6 | | | | | | 0 | 0 | 2 |
| 8 | | | | | | 0 | 2 | 1 |
| 10 | | | | | | 0 | 2 | 1 |
| 12 | | | | | | 3 | 1 | |
| 14 | | | | | | 2 | 3 | |
| 16 | | | | | | 2 | 3 | |
| 18 | | | | | | 0 | 2 | |
| 20 | | | | | | 0 | 3 | |
| 22 | | | | | | 2 | 1 | |
| 24 | | | | | | 1 | 1 | |
| 26 | | | | | | 1 | | |
| 28 | | | | | | 1 | | |

**TABLE 6: THERAPEUTIC RESPONSE OF CASES OF ACUTE PAINFUL CONDITIONS OF THE MUSCULOSKELETAL ORIGIN WITH AND WITHOUT VOLTAREN EMULGEL**

| | Voltaren Group | | | | Non-Voltaren Group | | | |
|---|---|---|---|---|---|---|---|---|
| **No. of Days of full Recovery** | **Very Severe No. of Subjects** | **Severe No. of Subjects** | **Moderate No. of Subjects** | **Mild No. of Subjects** | **Very Severe No. of Subjects** | **Severe No. of Subjects** | **Moderate No. of Subjects** | **Mild No. of Subjects** |
| 1 | | 2 | 27 | 4 | | 0 | 0 | 0 |
| 2 | | 3 | 19 | | | 0 | 0 | 0 |
| 3 | | 5 | | | | 0 | 0 | 0 |
| 4 | | 7 | 3 | | | 0 | 0 | 0 |
| 5 | | | | | | 0 | 0 | 0 |
| 6 | | | | | | 0 | 0 | 0 |
| 7 | | | | | | 0 | 0 | 5 |
| 8 | | | | | | 0 | 1 | 7 |
| 9 | | | | | | 1 | 0 | 3 |
| 10 | | | | | | 0 | 1 | 2 |
| 11 | | | | | | 1 | 1 | |
| 12 | | | | | | 1 | | |

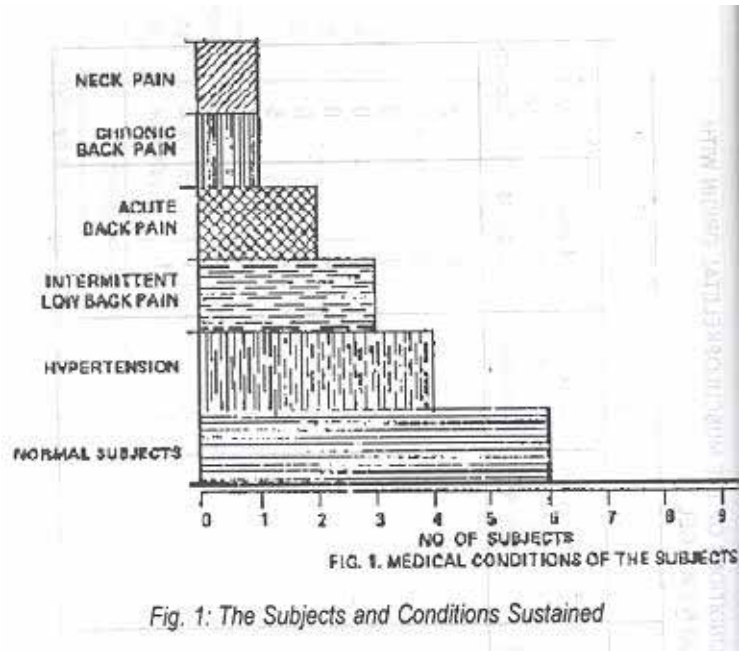



*Fig. 1: The Subjects and Conditions Sustained*

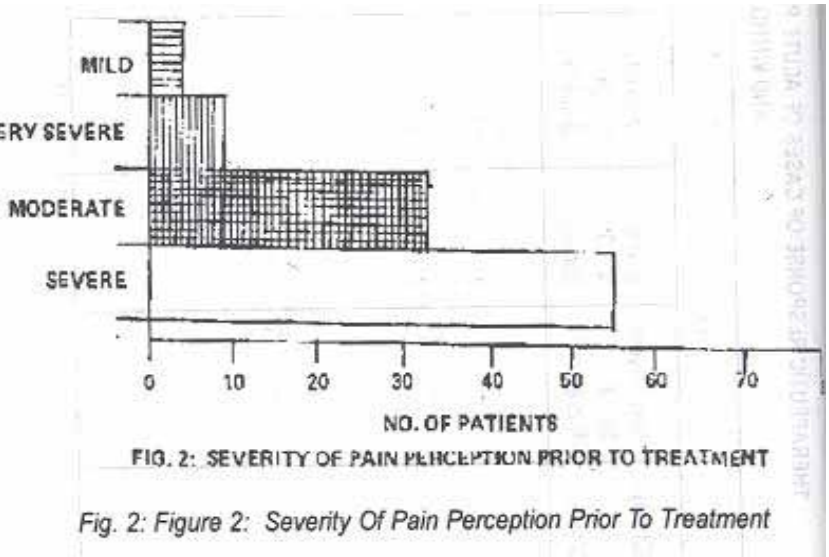



*Fig. 2: Figure 2: Severity Of Pain Perception Prior To Treatment*

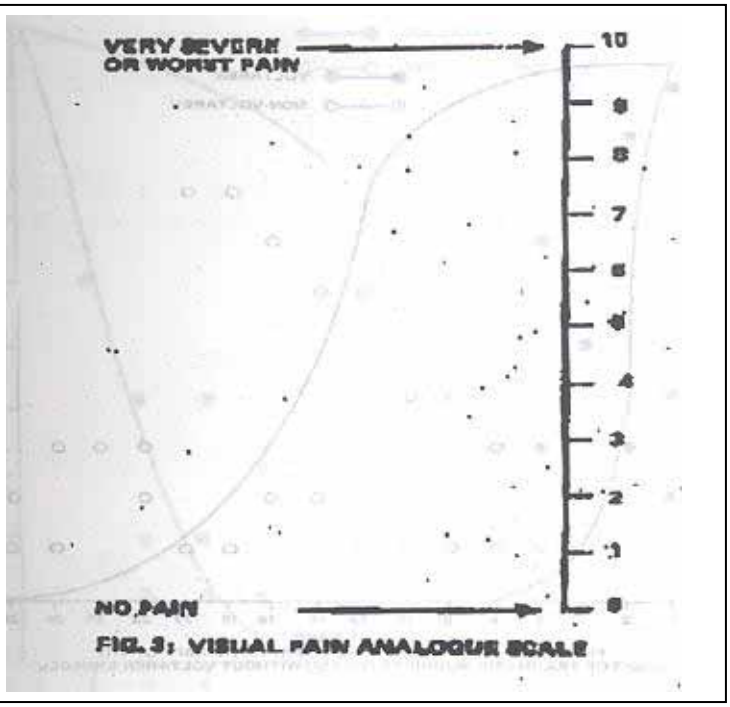
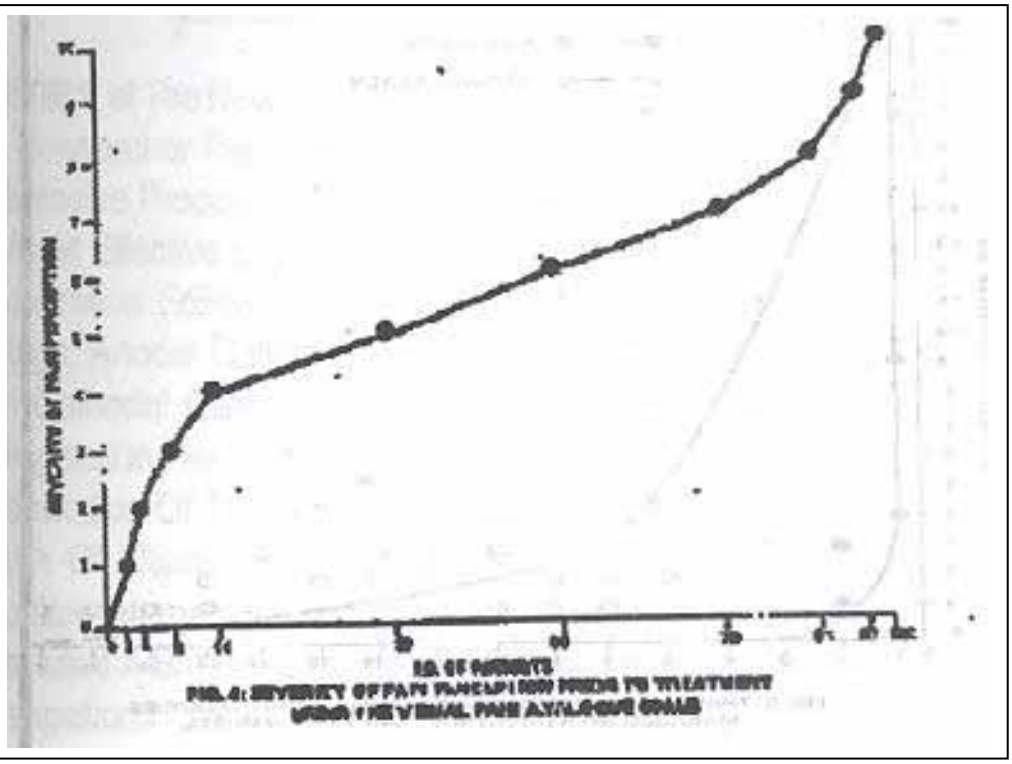


FIG. 3: VISUAL PAIN ANALOGUE SCALE



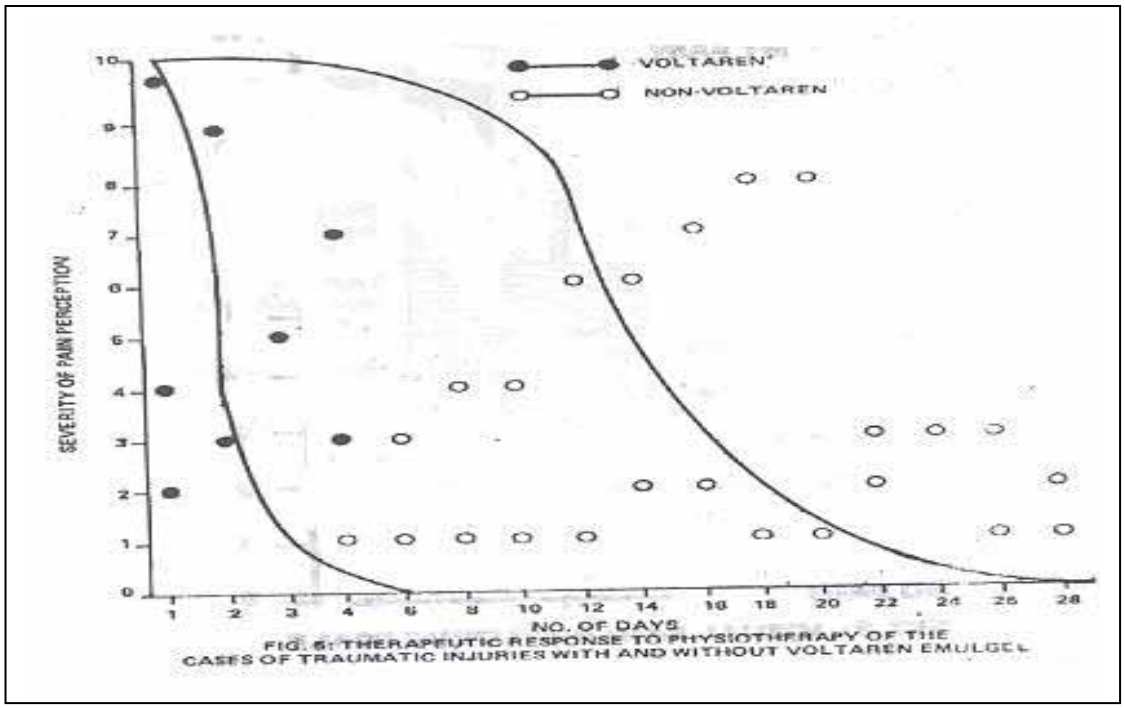


FIG. 6: THERAPEUTIC RESPONSE TO PHYSIOTHERAPY OF THE CASES OF TRAUMATIC INJURIES WITH AND WITHOUT VOLTAREN EMULGEL

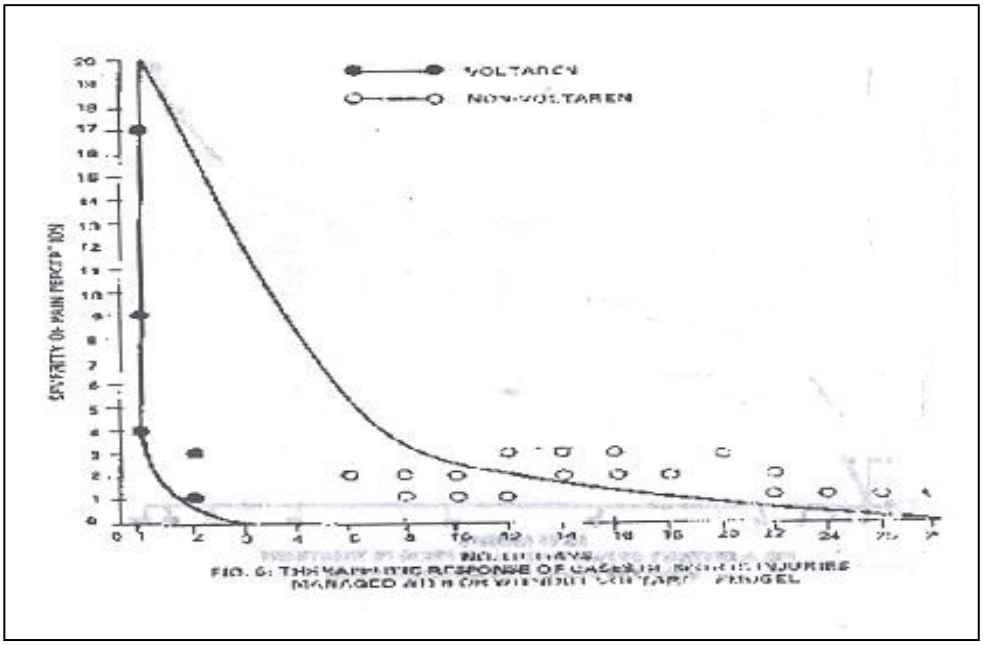
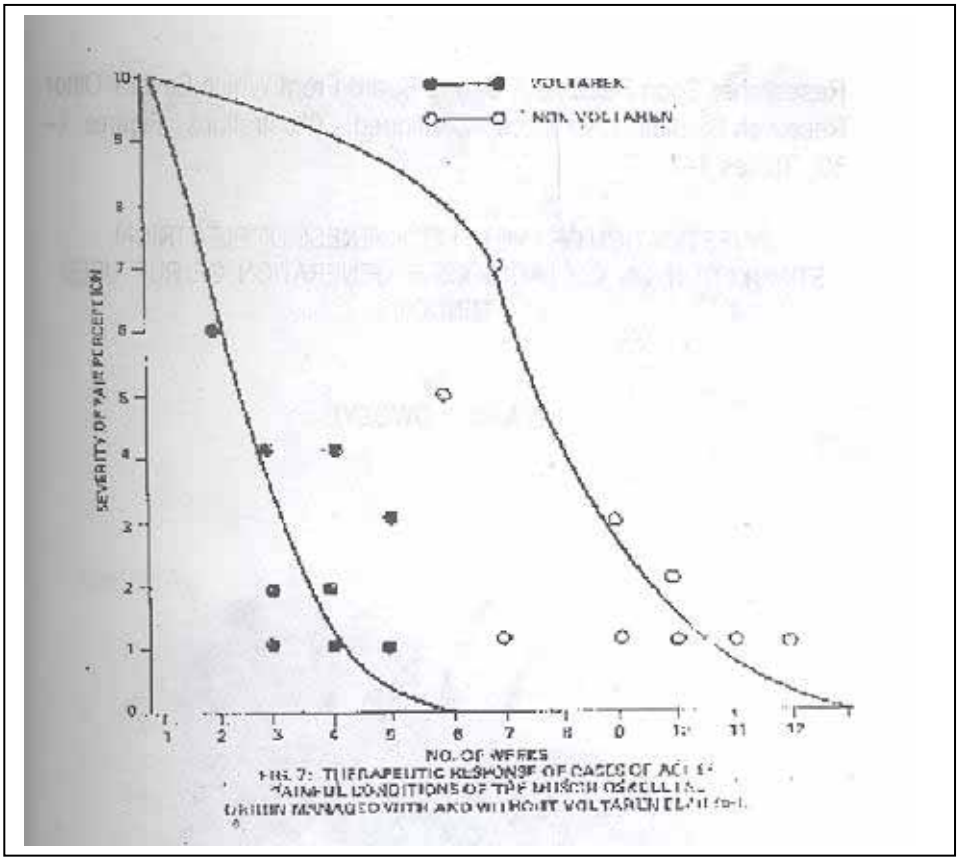


FIG. 6: THERAPEUTIC RESPONSE OF CASES IN ... INJURIES MANAGED WITH OR WITHOUT VOLTAREN EMULGEL

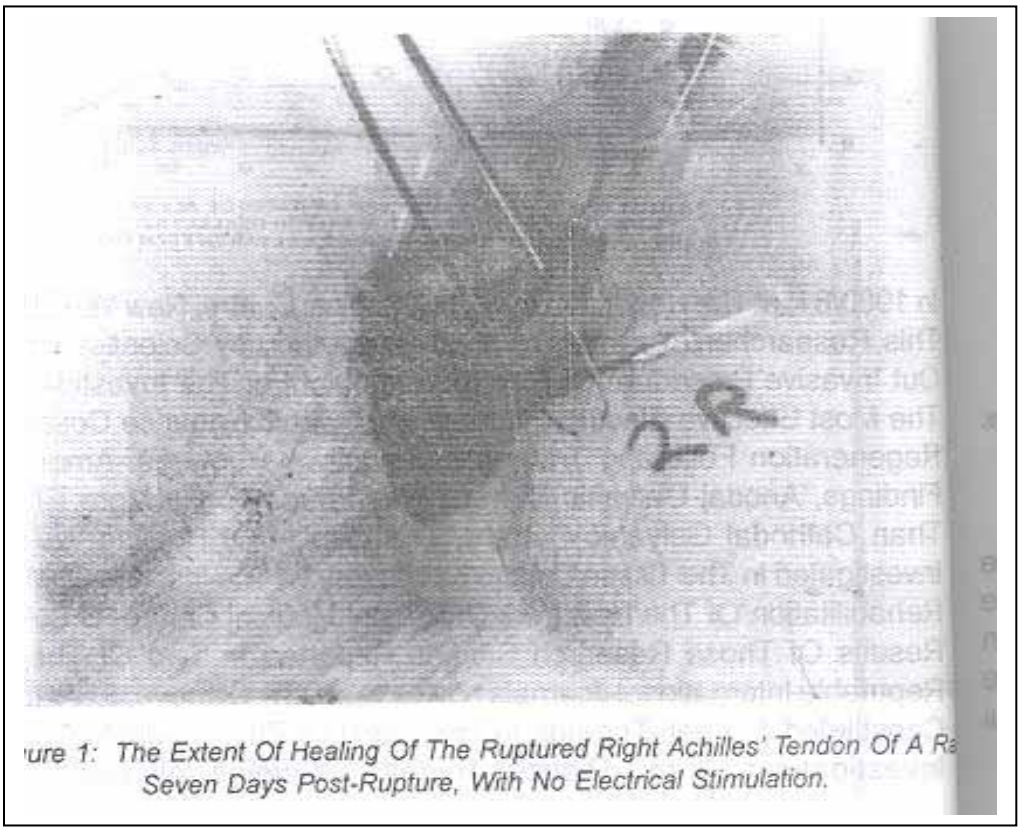



In 1980/81, at The New York University Medical Centre, New York, U.S.A., this Researcher became the first Physiotherapy Scientist to carry out invasive procedure of electrode implant for the investigation of the most effective electrical current that could enhance collaginous regeneration following traumatic tendinous ruptures. Among the findings, anodal galvanic current was found to be more effective than cathodal galvanic current. The quality of healing was also investigated in the tissue culture laboratory of the institute of medical rehabilitations of the New York university medical centre, U.S.A. The results of those research studies reported in two of the most reputable international journals (Owoeye, 1984; Owoeye, et.al. 1987) constituted a break-through in the world of physiotherapy scientific nvestigations. Those pioneer research studies initiated by this researcher soon became a springboard from which several other research studies have since continued, (Illustrations: Figures 1 – 30; Tables 1 – 7).

INVESTIGATION OF THE EFFECTIVENESS OF ELECTRICAL STIMULATION ON COLLAGINOUS REGENERATION OF RUPTURES TENDONS.

BY

ISAAC O. OWOEYE




ure 1: The Extent Of Healing Of The Ruptured Right Achilles' Tendon Of A Ra
Seven Days Post-Rupture, With No Electrical Stimulation.

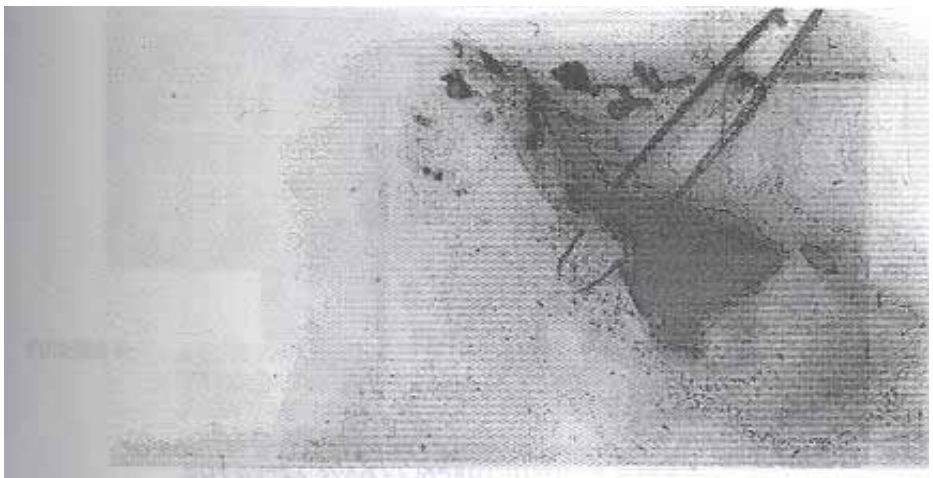


FIGURE 2: *AN EXPOSED NORMAL LEFT ACHILLES TENDON OF A RAT (I.E. UNRUPTURED), SEVEN DAYS AFTER THE RUPTURE OF ITS RIGHT ACHILLES TENDON.*

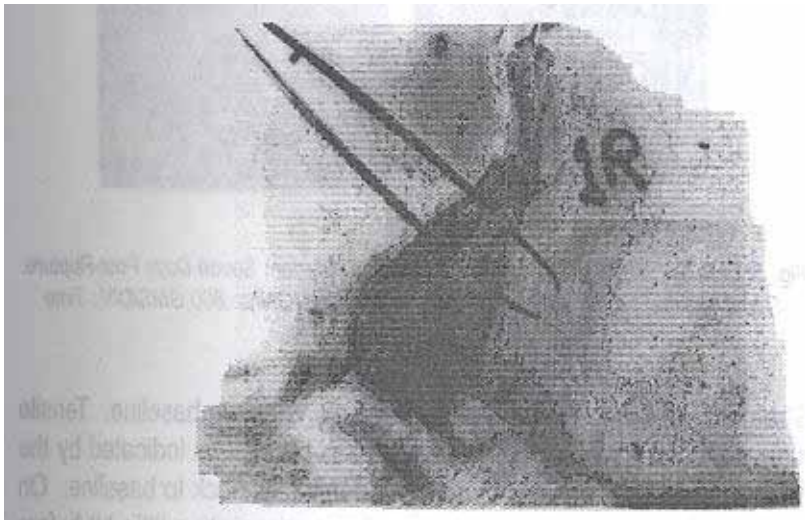


FIGURE 3: *THE EXTENT OF HEALING OF THE RUPTURED RIGHT ACHILLES TENDON OF A RAT, 14 DAYS POST- RUPTURE, WITH NO ELECTRICAL STIMULATION.*

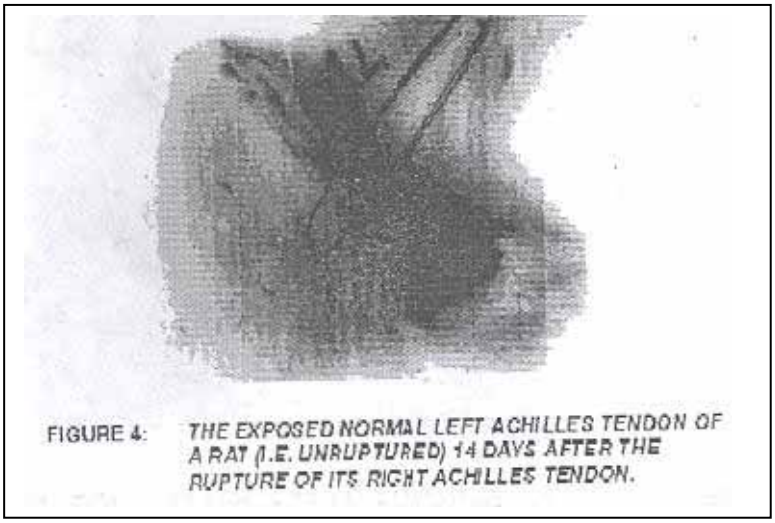


FIGURE 4: THE EXPOSED NORMAL LEFT ACHILLES TENDON OF A RAT (I.E. UNRUPTURED) 14 DAYS AFTER THE RUPTURE OF ITS RIGHT ACHILLES TENDON.

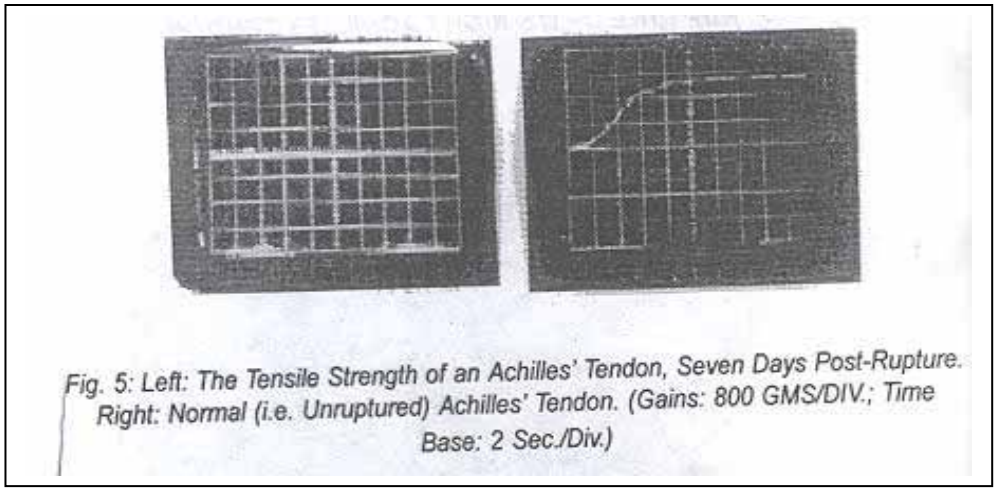


*Fig. 5: Left: The Tensile Strength of an Achilles' Tendon, Seven Days Post-Rupture. Right: Normal (i.e. Unruptured) Achilles' Tendon. (Gains: 800 GMS/DIV.; Time Base: 2 Sec./Div.)*

Stretching of tendon indicated by trace rising above baseline. Tensile strength of tendon, i.e. force required to break it, is indicated by the height the trace reaches before it suddenly falls back to baseline. On the left, after seven days of healing, trace rose only a little bit before tendon broke at site of previous tenotomy. On the right, the normal contralateral tendon did not break.

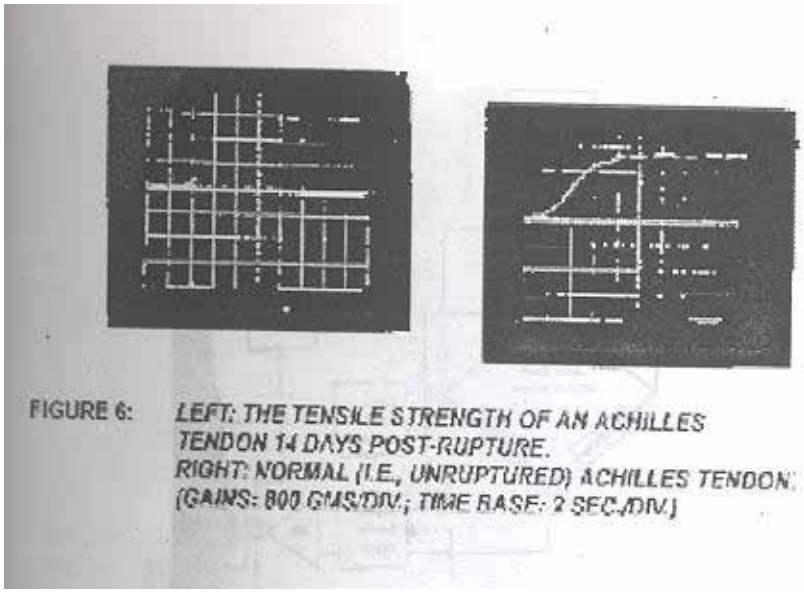


FIGURE 6: *LEFT: THE TENSILE STRENGTH OF AN ACHILLES TENDON 14 DAYS POST-RUPTURE. RIGHT: NORMAL (I.E., UNRUPTURED) ACHILLES TENDON. (GAINS: 800 GMS/DIV.; TIME BASE: 2 SEC./DIV.)*

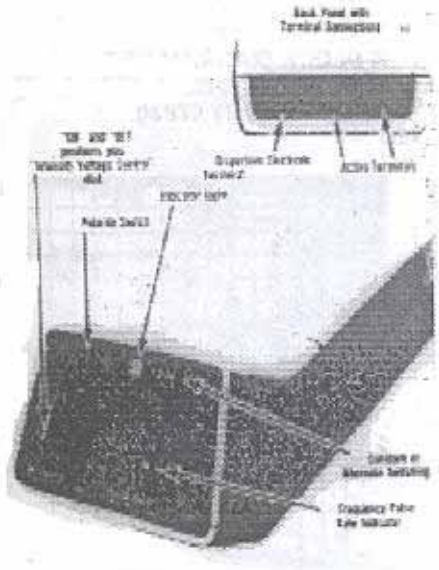


FIGURE 7: *THE COMPONENT PARTS OF THE PORTABLE ELECTRO-GALVANIC STIMULATOR.*

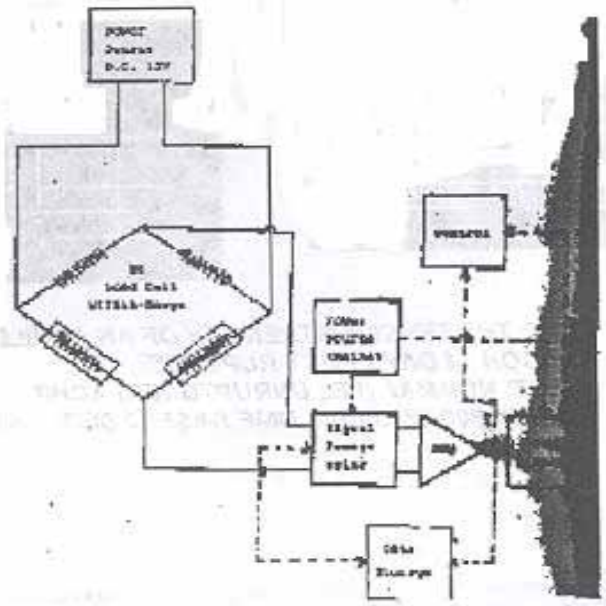


FIGURE 8: *A BLOCK DIAGRAM OF THE ASSESSMENT UNIT (THE BG LOAD CELL STRAIN-GUAGE, AND ITS RECORDING SYSTEM).*

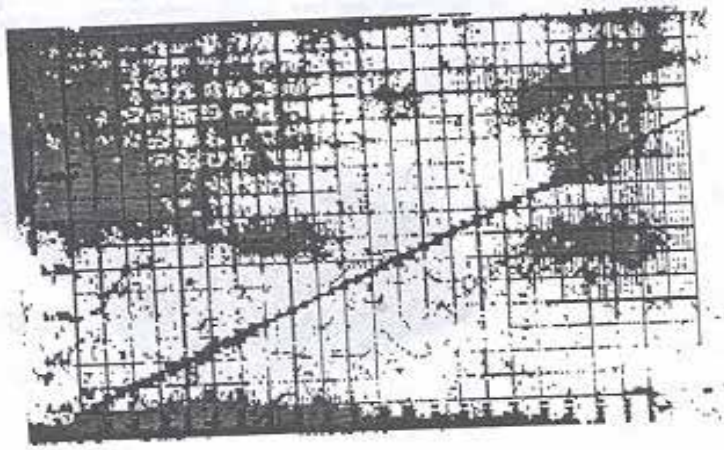


*Fig. 9: The Calibration of the Load Cell Strain-Gauge*

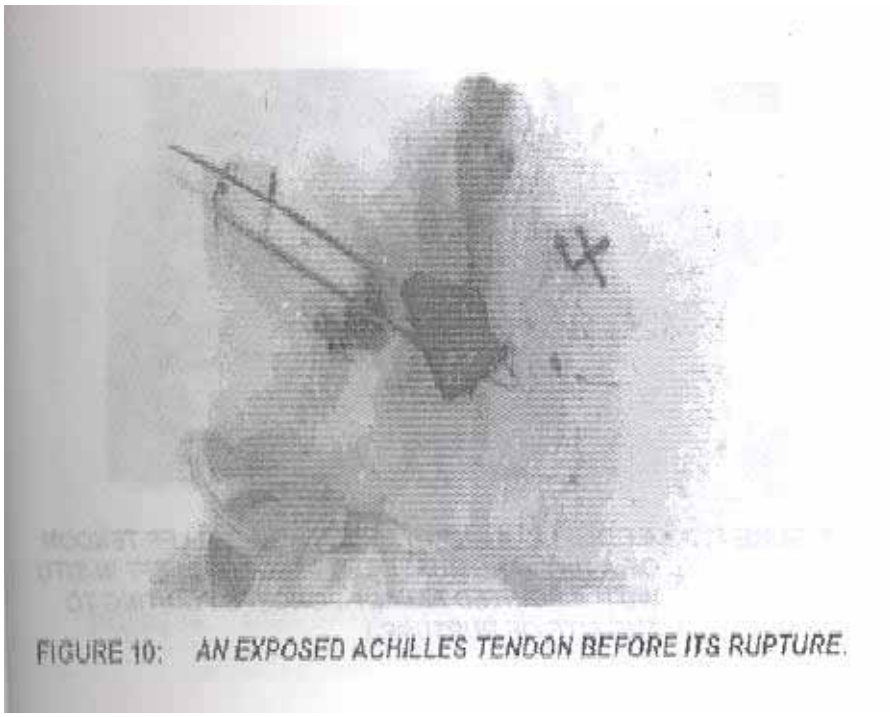


FIGURE 10: AN EXPOSED ACHILLES TENDON BEFORE ITS RUPTURE.

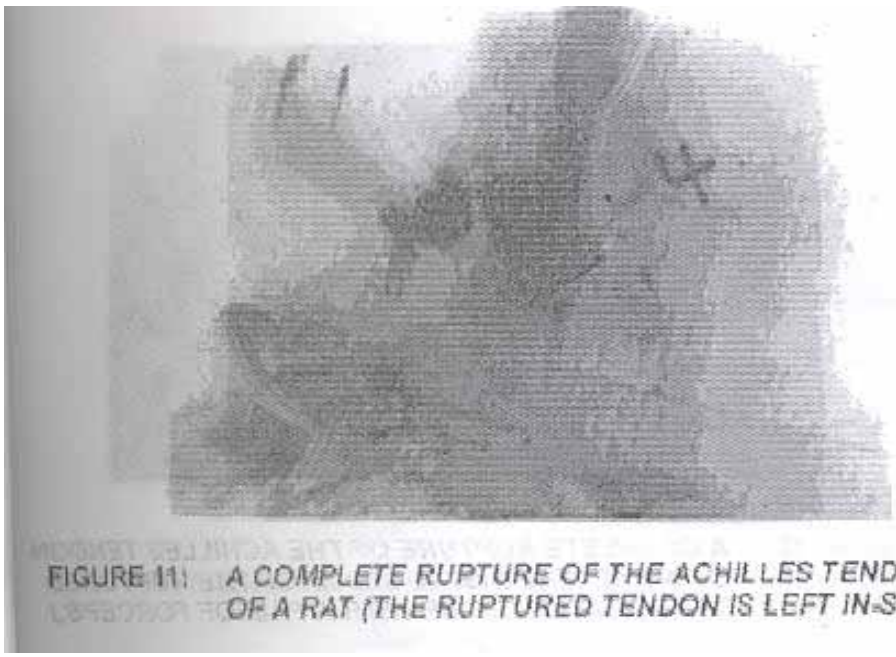


FIGURE 11: A COMPLETE RUPTURE OF THE ACHILLES TENDON OF A RAT (THE RUPTURED TENDON IS LEFT IN-SITU)

FIGURE 12: *A COMPLETE RUPTURE OF THE ACHILLES TENDON OF A RAT. (THE RUPTURED TENDON IS LEFT IN-SITU WITH A POINTED PAIR OF FORCEPS POINTING TO THE SITE OF RUPTURE.)*

FIGURE 13: *A COMPLETE RUPTURE OF THE ACHILLES TENDO OF A RAT. (THE DISTAL STUMP OF THE RUPTURE TENDON IS LIFTED UP WITH A PAIR OF FORCEPS*

FIGURE 14 SOME OF THE RATS, 24 HOURS AFTER EXPERIMENTAL RUPTURE OF THEIR RIGHT ACHILLES TENDONS

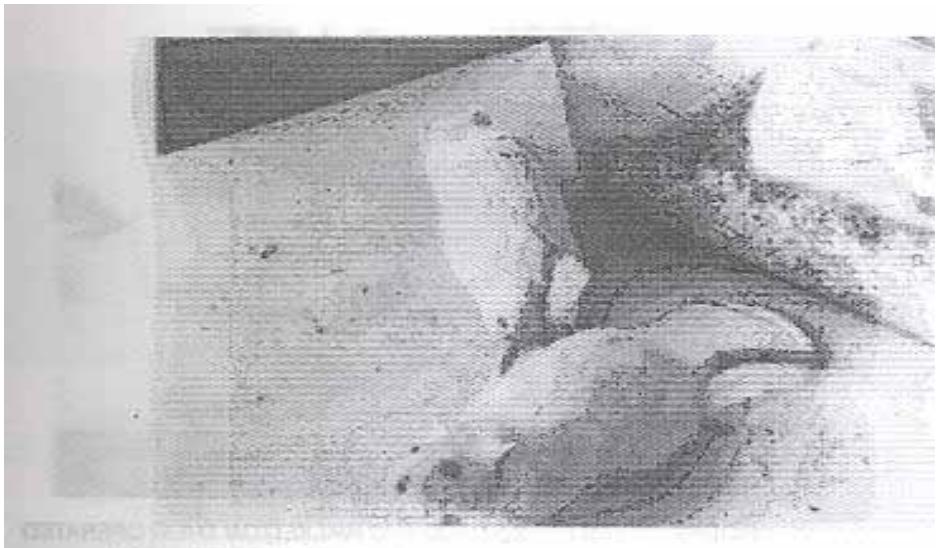


FIGURE 15: SOME OF THE RATS IN ACTIVE MOVEMENTS, 48 HOURS AFTER THE RUPTURE OF THEIR RIGHT ACHILLES TENDONS.

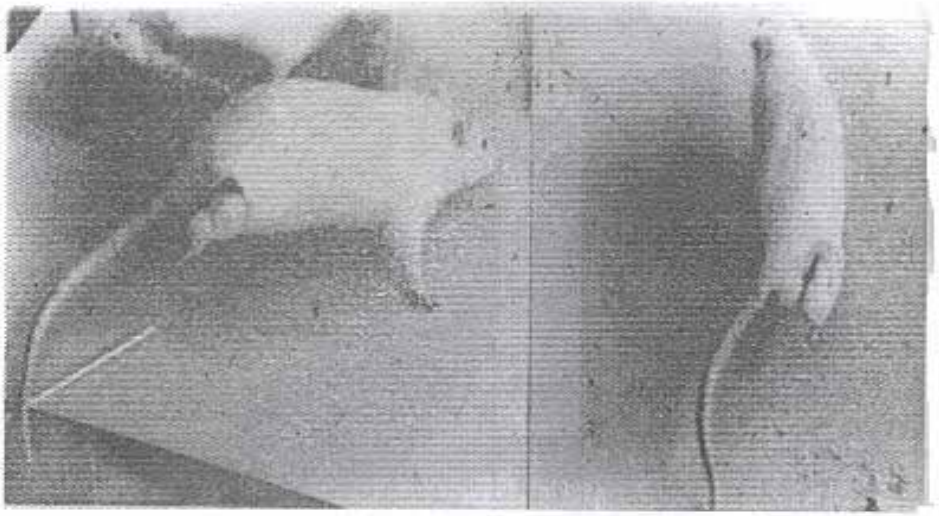


FIG. 16: THE RATS, 48 HOURS POST-RUPTURE OF THEIR RIGHT ACHILLES TENDONS, AMBULATED WITH A CHARACTERISTICS GAIT (EXTENDING THE RIGHT HIND LIMB AT THE HIP JOINT).

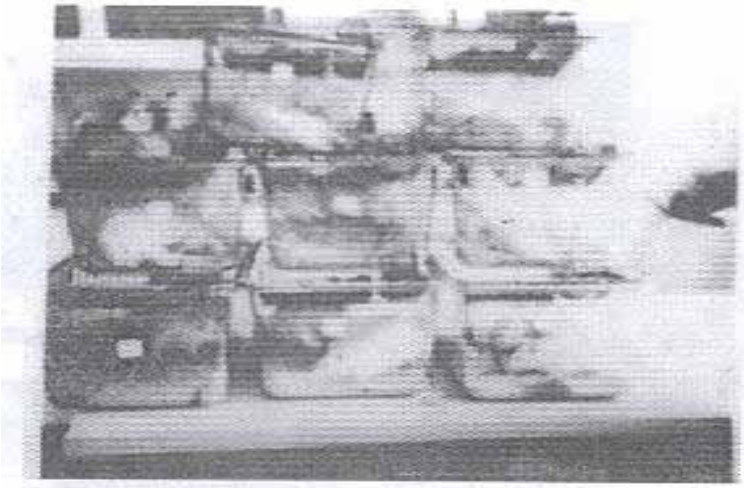


FIGURE 17: THE RATS STOOD AND WALKED ON THEIR OPERATED LIMBS, 13 DAYS POST-RUPTURE OF THEIR RIGHT ACHILLES TENDONS.

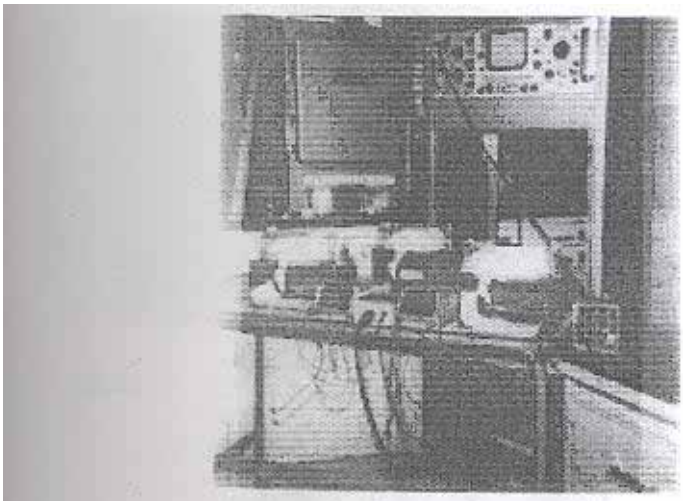


FIGURE 18: *THE TREATMENT SET-UP FOR THE ANIMALS.*

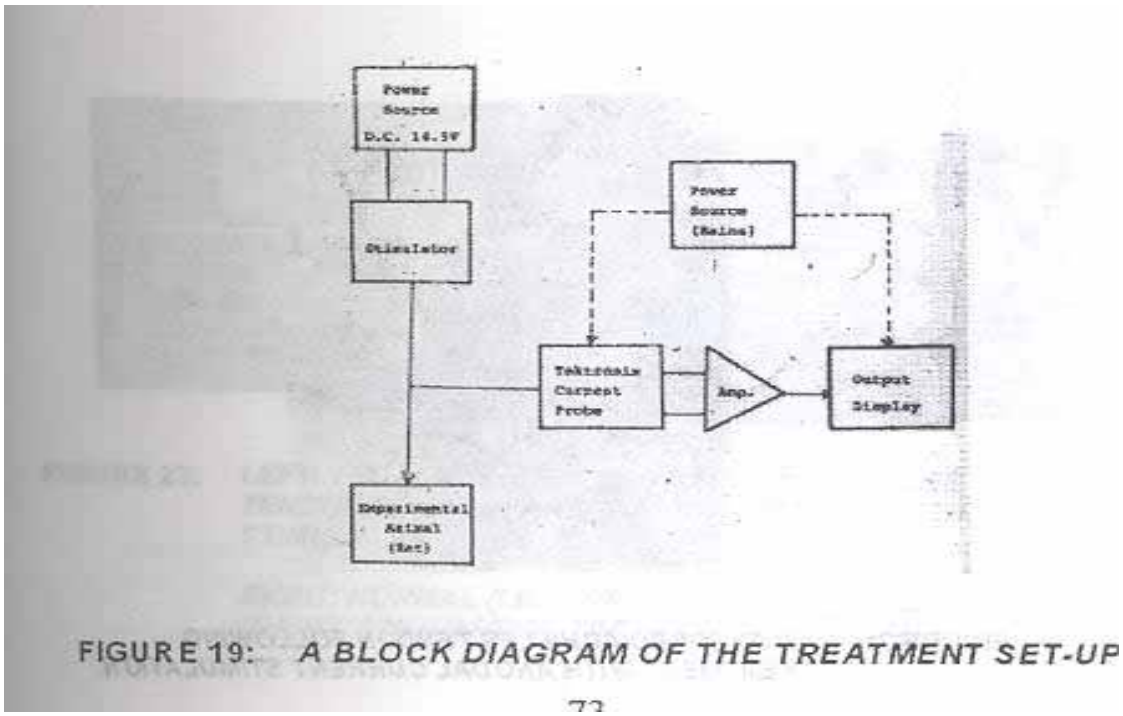



FIGURE 19: *A BLOCK DIAGRAM OF THE TREATMENT SET-UP*


FIGURE 20: *THE EXTENT OF SUPERFICIAL HEALING OF ONE OF THE ACHILLES TENDONS, TREATED WITH ANODAL CURRENT STIMULATION.*


FIGURE 21: *AN EXPOSED ACHILLES TENDON FOLLOWING TREATMENT WITH ANODAL CURRENT STIMULATION.*

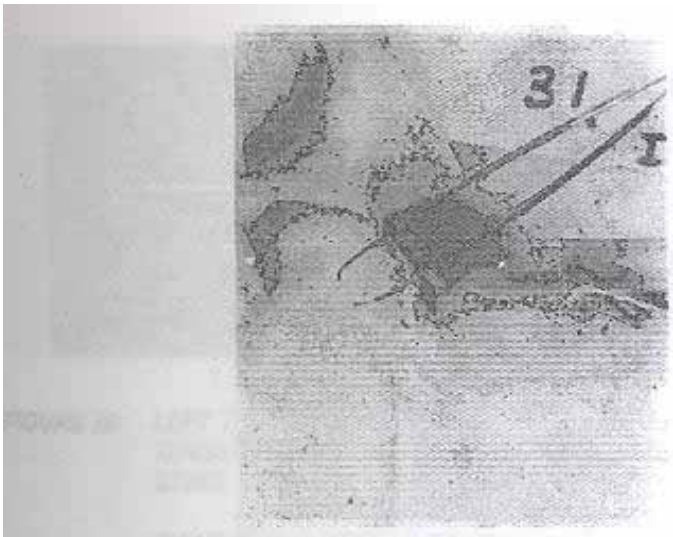
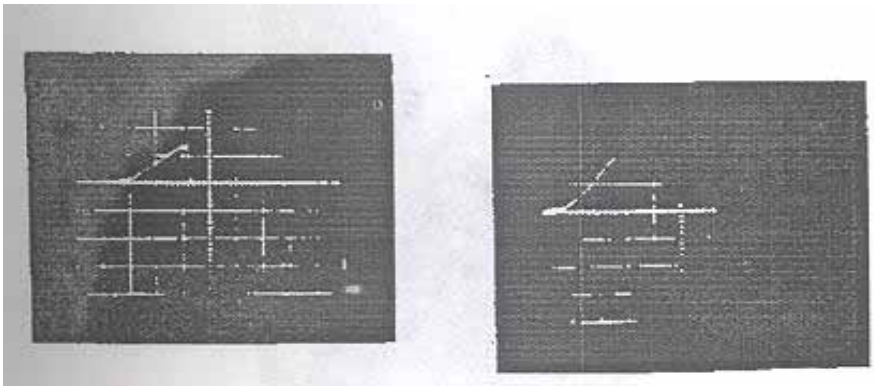



FIGURE 22: *THE EXTENT OF HEALING OF A RUPTURED ACHILLES TENDON TREATED WITH ANODAL CURRENT STIMULATION.*



IGURE 23: *LEFT: THE TENSILE STRENGTH OF AN ACHILLES TENDON FOLLOWING 14 DAYS ANODAL CURRENT STIMULATION.*

*RIGHT: NORMAL (I.E., UNRUPTURED) ACHILLES TENDON. (GAINS: 800 GMS/DIV., TIME BASE; 2 SEC./DIV.)*


FIGURE 24: *THE EXTENT OF SUPERFICIAL HEALING ON ONE OF THE ACHILLES TENDONS TREATED WITH CATHODAL CURRENT STIMULATION (THE DARK AREAS AROUND THE ANKLE SHOW THE EXTENT OF NECROTIC TISSUES).*


FIGURE 25: *THE EXTENT OF HEALING OF ONE OF THE ACHILLES TENDONS TREATED WITH CATHODAL CURRENT STIMULATION (THE TENDON RUPTURED WHILE REMOVING THE SUTURES, AN INDICATION OF NO HEALING, AND OF ZERO TENSILE STRENGTH)*

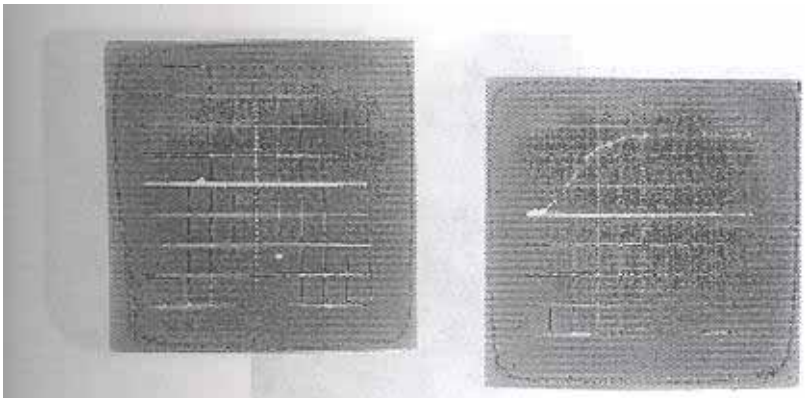


FIGURE 26: LEFT: THE TENSILE STRENGTH OF AN ACHILLES TENDON FOLLOWING 14 DAYS CATHODAL CURRENT STIMULATION.

RIGHT: NORMAL (I.E., UNRUPTURED) ACHILLES TENDON. (GAINS: 800 GMS/DIV., TIME BASE; 2 SEC./DIV.)


FIGURE 27 THE EXTENT OF SUPERFICIAL HEALING OF ONE OF THE ACHILLES TENDONS, TREATED WITH NO ELECTRICAL STIMULATION.

FIGURE 28: *AN EXPOSED ACHILLES TENDON FOLLOWING TREATMENT WITH NO ELECTRICAL STIMULATION.*

FIGURE 29: *THE EXTENT OF HEALING OF A RUPTURED ACHILLES TENDON WITH NO ELECTRICAL STIMULATION.*

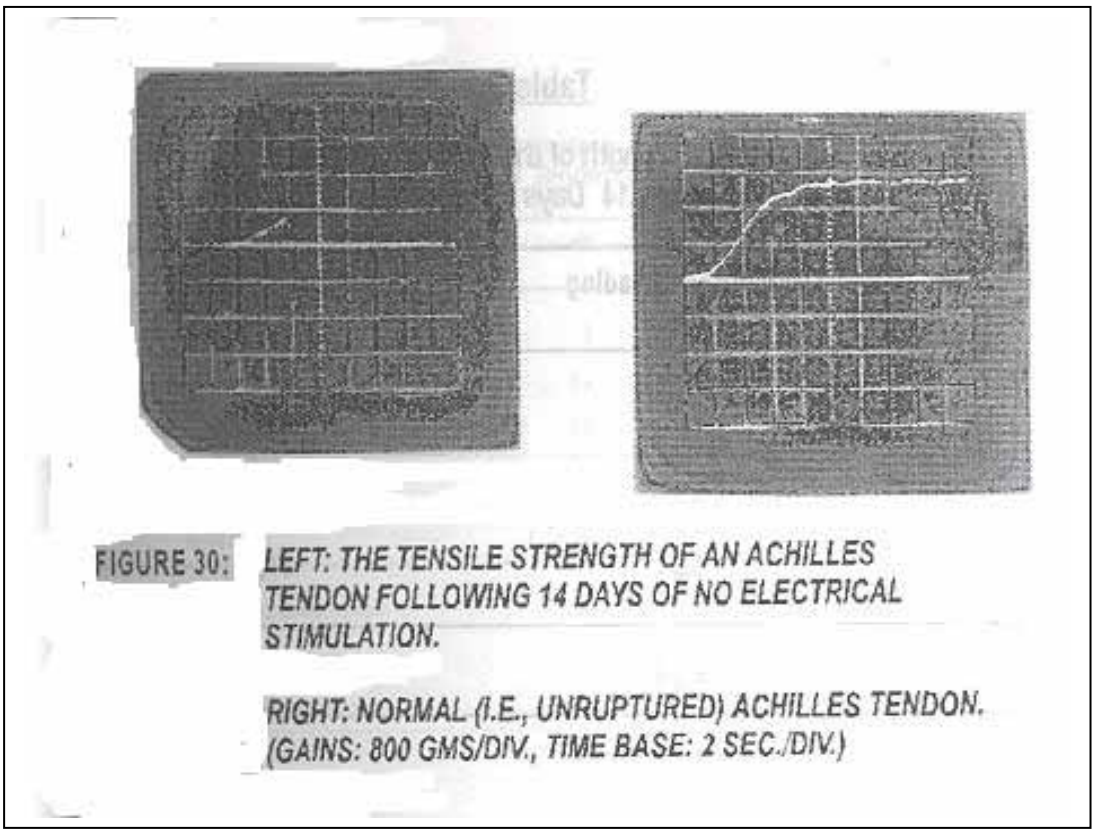


FIGURE 30: LEFT: THE TENSILE STRENGTH OF AN ACHILLES TENDON FOLLOWING 14 DAYS OF NO ELECTRICAL STIMULATION.

RIGHT: NORMAL (I.E., UNRUPTURED) ACHILLES TENDON. (GAINS: 800 GMS/DIV., TIME BASE: 2 SEC./DIV.)

**TABLE 1: TENSILE STRENGTH OF THE HEALED ACHILLES TENDON SEVEN DAYS POST-RUPTURE**

| No. | Oscilloscope Reading (in cm) | Tensile Strength (in gms) |
|---|---|---|
| 1 | 0.35 | 280.00 |
| 2 | 0.35 | 280.00 |
| 3 | 0.35 | 280.00 |
| | $\overline{x} = 0.35$ | $\overline{x} = 280.00$ |

**TABLE 2: TENSILE STRENGTH OF THE HEALED ACHILLES TENDON 14 DAYS POST-RUPTURE**

| No. | Oscilloscope Reading (in cm) | Tensile Strength (in gms) |
|---|---|---|
| 1 | 0.6 | 470.00 |
| 2 | 0.6 | 470.00 |
| 3 | 0.6 | 470.00 |
| | $\overline{x} = 0.6$ | $\overline{x} = 470.00$ |

**TABLE 3 POWER OF ANALYSIS OF VARIANCE FOR SELECTED EFFECT AND SAMPLE SIZES**

| | Average Effect Size | | | |
|---|---|---|---|---|
| | $\frac{1}{2}\sigma^2$ (modest) | | $1\sigma$ (large) | |
| | = .05 | = .01 | = .05 | = .01 |
| N = 10 per group | .48 | .25 | .97 | .88 |
| N = 20 per group | .78 | .54 | $.99^{+}$ | $.66^{+}$ |

[a]Size of rejection region

**TABLE 4: ONE-WAY ANALYSIS OF VARIOUS OF TENSILE STRENGTH OF ACHILLES TENDON BY GROUP**

| Source of Variation | SS | df | MS | F |
|---|---|---|---|---|
| Between Groups | 6,946,685.83 | 2 | 3,473,34292 | 111.98* |
| Within Groups | 1,767,988.75 | 57 | 31,017.35 | |
| Total | 8,714,674.58 | 59 | | |

| Group | N | Mean | SD |
|---|---|---|---|
| Anodal Current Stimulation | 20 | 1051.500 | 253.890 |
| Cathodal Current Stimulation | 20 | 190.750 | 94.259 |
| No Electrical Stimulation | 20 | 499.000 | 140.381 |

*P < .001

**TABLE 5: ONE-WAY ANALYSIS OF COVARIANCE OF POST-TREATMENT CALF CIRCUMFERENCE BY GROUP, CONTROLLING FOR PRE-TREATMENT CIRCUMFERENCE**

| Source of Variation | SS | df | MS | F |
|---|---|---|---|---|
| Covariant (Pre) | 1.702 | 1 | 1.702 | 142.53* |
| Between Groups | .536 | 2 | .268 | 22.43* |
| Within Groups | .669 | 56 | .012 | |
| Total | 2.907 | 59 | | |

| Group | N | Adjusted Post-treatment Mean | Adjusted Post-treatment SD |
|---|---|---|---|
| Anodal Current Stimulation | 20 | 6.762 | 0.097 |
| Cathodal Current Stimulation | 20 | 6.535 | 0.114 |
| No Electrical Stimulation | 20 | 6.688 | 0.112 |

*P < .001

**TABLE 6: ONE-WAY ANALYSIS OF COVARIANCE OF POST-TREATMENT BODY WEIGHT BY GROUP, CONTROLLING FOR PRE-TREATMENT WEIGHT**

| Source of Variation | SS | df | MS | F |
|---|---|---|---|---|
| Covariant (Pre) | 28,909.85 | 1 | 28,909.85 | 97.19* |
| Between Groups | 3,514.44 | 2 | 1,757.22 | 5.91** |
| Within Groups | 16,658.29 | 56 | 297.47 | |
| Total | 49,082.58 | | | |

| Group | N | Adjusted Post-treatment Mean | Adjusted Post-treatment SD |
|---|---|---|---|
| Anodal Current Stimulation | 20 | 376.189 | 22.614 |
| Cathodal Current Stimulation | 20 | 357.791 | 20.841 |
| No Electrical Stimulation | 20 | 377.903 | 17.947 |

*P < .001
**P < .01

**TABLE 7: ONE-WAY ANALYSIS OF VARIANCE OF PERCENTAGE INCREASE IN LENGTHS OF THE ACHILLES TENDON BEFORE RUPTURE, BY GROUP**

| Source of Variation | SS | df | MS | F |
|---|---|---|---|---|
| Between Groups | 0.027 | 2 | 0.0135 | 16.05* |
| Within Groups | 0.048 | 57 | 0.0008 | |
| Total | 0.075 | 59 | | |

| Group | N | Mean | SD |
|---|---|---|---|
| Anodal Current Stimulation | 20 | 0.0948 | 0.0340 |
| Cathodal Current Stimulation | 20 | 0.0438 | 0.0340 |
| No Electrical Stimulation | 20 | 0.0619 | 0.0138 |

*P < .001

## ELECTROMYOGRAPHIC ACTIVITIES OF THE LOWER TRUNK MUSLCES

In that same institution (i.e. at the Institute of Rehabilitation Medicine, Department of Physical Therapy of the New York University Medical Centre, U. S. A., 1980/81) Owoeye investigated the Electromyography activities of the lower trunk muscles (Owoeye, 1996). The findings were very astonishing. First, it was found that several people lose their abdominal muscle powers over time. Secondly, it was found that the weakness of the abdominal muscles was implicated for the incidence of the back pains in such people. Before then, Physical Therapists concentrate on strengthening of the back muscles in the physical management of back pains. But since this physiotherapeutic breakthrough (i.e. 1980/81), physiotherapists have learnt not to neglect cares for the abdominal muscles in the physical management of back pains.

Prior to 1983, the skin sensation test to heat changes in physiotherapy was carried out without any scientific basis. In 1982/83 this researcher initiated a research study on: Thermal Sensation: The Basis for the Skin Sensation Test in Electrotherapy and Thermal-therapy (Owoeye, 1983). The results of the study were exciting. For the first time that study established the scientific basis of skin sensation test as well as identified the best technique for the test. This published work has since been a reference paper for physiotherapists the world over, (illustrations: Tables 1 – 2; figures 1 – 3). Findings:

**TABLE 1: SENSITIVITY AT SOME TEMPERATURE RANGES**

| **TEMPERATURE** | **SENSITIVITY** | | | |
|---|---|---|---|---|
| | **NIL** | **COLD** | **WARM** | **HOT** |
| $5^oC$ ($0^oC – 10^oC$) | 0 (0%) | 21 (100%) | 0 (0%) | 0 (0%) |
| $5^oC$ ($0^oC – 10^oC$) | 0 (0%) | 21 (100%) | 0 (0%) | 0 (0%) |
| $33^oC$ ($32^oC – 34^oC$) | 16 (76.2%) | 2 (9.5%) | 3 (14.3%) | 0 (0%) |
| $40^oC$ ($39^oC – 41^oC$) | 0 (0%) | 0 (0%) | 19 (90.5%) | 2 (9.5%) |
| $47^oC$ ($45^oC – 49^oC$) | 0 (0%) | 0 (0%) | 0 (0%) | 21 (100%). |

| | | | | |
|---|---|---|---|---|
| | | | | |

INDEPENDENT VARIABLES: TEMPERATURE RANGES

DEPENDENT VARIABLE: SENSITIVITY

**TABLE 2: SENSITIVITY AND INTENSITY OF SENSITIVITY AT SOME TEMPERATURE RANGES**

| **TEMPERATURE RANGES** | **SENSITIVITY** | **INTENSITY OF SENSITIVITY** | | | | |
|---|---|---|---|---|---|---|
| | | **NIL** | **MILD** | **MODE-RATE** | **INTENSE** | **PAIN** |
| $5^oC$ ($0^oC – 10^oC$) | COLD 21 (100%) | 0 (0%) | 0 (0%) | 0 (0%) | 21 (100%) | 20 (95.2%) |
| $20^oC$ ($15^oC – 25^oC$) | COLD 21 (100%) | 0 (0%) | 0 (0%) | 21 (100%) | 0 (0%) | 0 (0%) |
| $33^oC$ ($32^oC – 34^oC$) | NIL 16 (76.2%) | 16 (76.2%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| $40^oC$ ($39^oC – 41^oC$) | WARM 19 (90.5%) | 0 (0%) | 0 (90.5%) | 17 (9.5%) | 2 | 0 |
| $47^oC$ ($45^oC – 49^oC$) | HOT 21 (100%) | 0 (0%) | 0 (0%) | 0 (0%) | 21 (100%) | 21 (100%) |

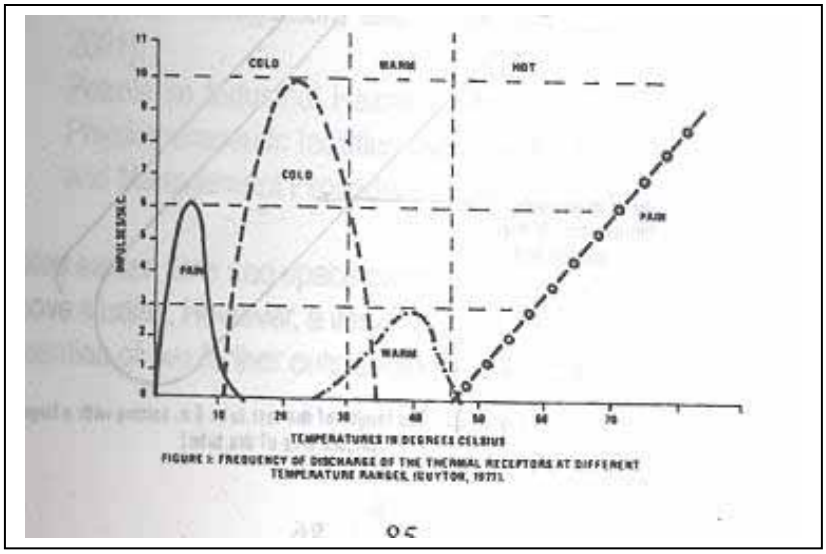



FIGURE 1: FREQUENCY OF DISCHARGE OF THE THERMAL RECEPTORS AT DIFFERENT TEMPERATURE RANGES, (GUYTON, 1971).

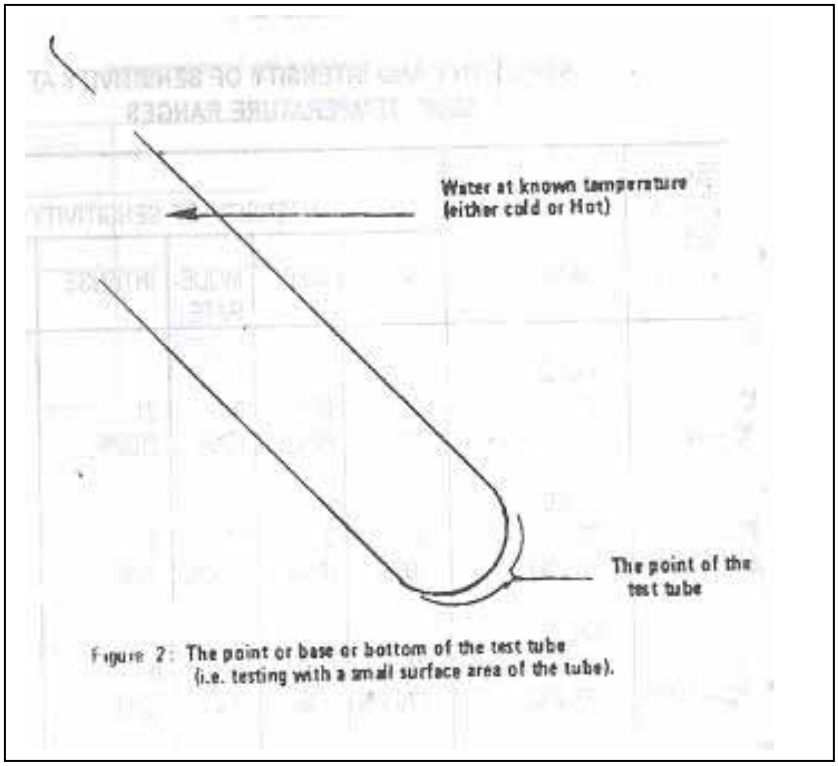



Figure 2: The point or base or bottom of the test tube (i.e. testing with a small surface area of the tube).

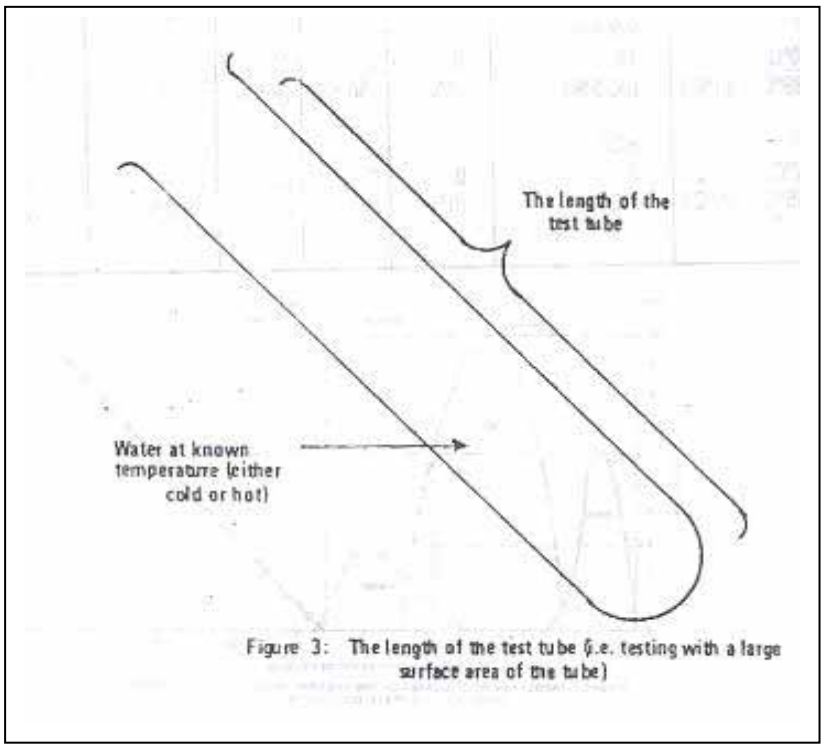



Figure 3: The length of the test tube (i.e. testing with a large surface area of the tube)

Right from 1980 and up till now Owoeye has been involved in several research studies of different dimensions. To cite few examples, Owoeye has investigated:

(i) The pattern of the incidence of Burns and Physical Management (Raji and Owoeye, 1984).

(ii) Sex Differences in Electromyographic Activities of the Lower Trunk Muscles (Owoeye, 1996).

(iii) Myoelastic Elements: Enhancement of Performance by Electrical Stimulation and Physical Exercise (Owoeye, 1987).

(iv) Electrical Stimulus: An inducing factor for muscular Efficiency rather than enhancement of Body Weight and Muscle Hypertrophy (Owoeye, 1990)

(v) Management and Rehabilitation of victims of road traffic accidents (Owoeye, *et al*. 1992).

(vi) Prolapsed Uterus: Physiotherapeutic Management (Owoeye, 1993).

(vii) Systolic and Diastolic Blood Pressures: Differential Effects due to Physical Fitness and Physical Training (Owoeye, 1988).

(viii) Cardiovascular responses to Physical Stress (Owoeye and Akinkoye, 1991).

(ix) Cardio-respiratory responses of Adults in different occupations of Physical stress (Owoeye,1992)

(x) Transcutaneous Electrical Nerve Stimulation: Its place in Medical Management and Medical Rehabilitation (Owoeye, 2001).

(xi) Petroleum Industrial Hazards: Remedial Measures including Physiotherapeutic facilities available for Preventive Measures and Management Procedure (Owoeye, 2002) etc., etc.

As stated earlier, time and space cannot permit detailed descriptions of the above studies. However, a very little time will now be expended on a brief mention of two further outstanding investigations.

**MANAGEMENT OF UNHEALING DECUBITOUS ULCERS**

In 1984/86 at the Lagos University Teaching Hospital, Idi-Araba, Lagos Nigeria, the problem that received the attention of this researcher was management of unhealing decubitous ulcers, some of which were three to five years old ulcers. Following a break-through in the identification of ultra-violet rays as enhancing successful healing of the ulcers record time of about 12 – 21 days, an experimental collaborative research studies was initiated in 1986/87 on management of traumatic open wounds. Again, another break-through was recorded on the cost-effectiveness of solar radiation but which in physiotherapy can be artificially produced, regulated and clinically applied.

In recent time, in Nigeria and the rest of the world, the cost of wound cares has become very exorbitant to the patients. Here, this researcher and his research colleagues (Owoeye and Adeyemi-Doro, 1995), in this experimental investigation have identified a very reliable physiotherapeutic procedure that can accelerate wound healing and hence cut down on hospital bills (Illustrations: Figures 1 – 7; Tale 1 – 3; Figures 8 – 9).

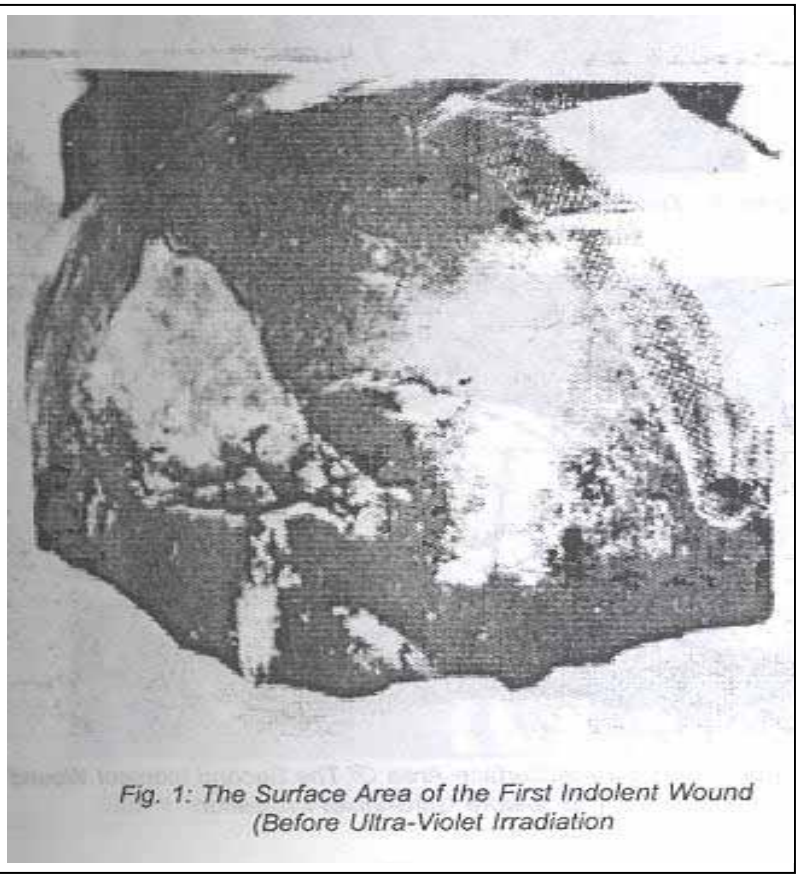


*Fig. 1: The Surface Area of the First Indolent Wound (Before Ultra-Violet Irradiation*

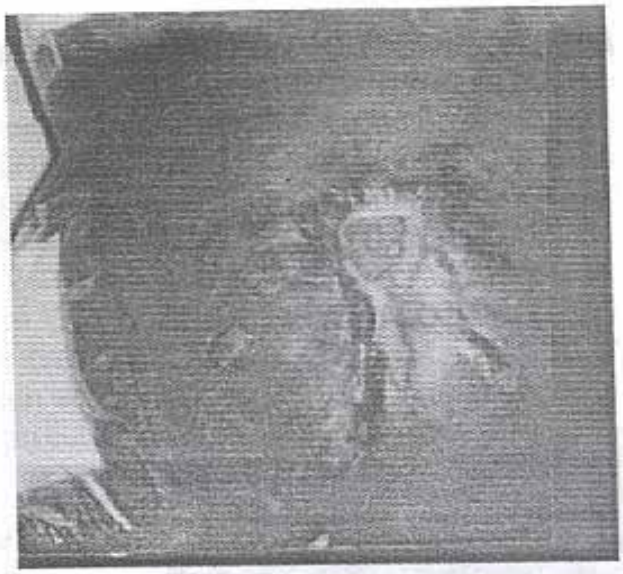


*Figure 2: The Surface Area Of The First Indolent Wound Following Ten Weeks Of Ultra-Violet Irradiation.*

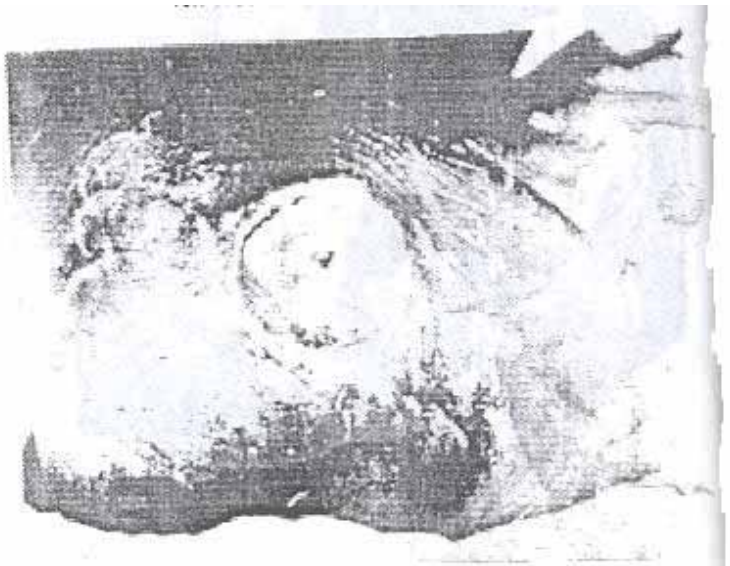


*Figure 3: The Initial Surface Area Of The Second Indolent Wound (I.E. Before Ultra-Violet Irradiation*

*Figure 4: The Surface Area Of The Second Indolent Wound Following Ten Weeks Of Ultra-Violet Irradiation*

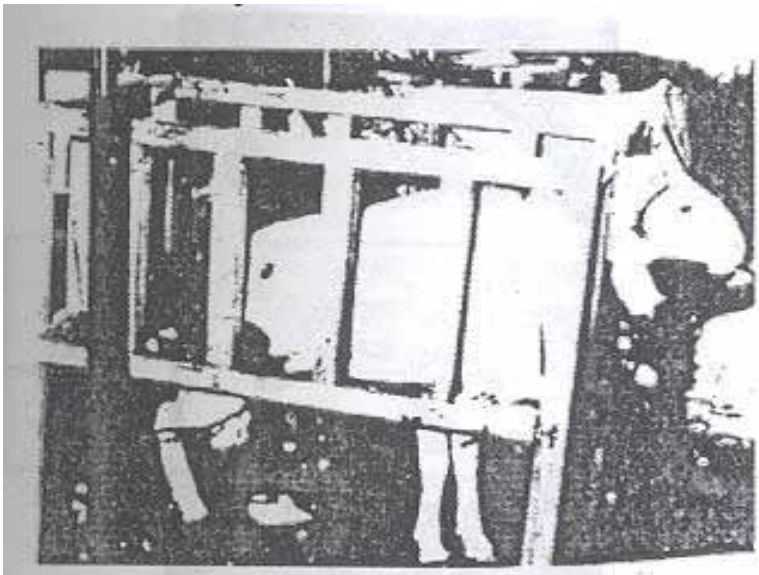


Figure 5: The Experimental Animal In Its Restraining Cage


Figure 6: The Initial Surface Areas Of The Traumatic (I.E. Surgical) Wounds

*Figure 7: The Wound Surfaces, Two Weeks After Surgical Operation.*

**TABLE 1: BODY WEIGHT (OF EXPERIMENTAL ANIMAL)**

**BODY WEIGHT**

| DATE OF MEASURMENT | WEIGHT (KG.) |
|---|---|
| 29/12/86 | 25 |
| 06/01/87 | 24 |
| 16/01/87 | 25 |

**TABLE 2: THE HEALING RATE BY SURFACE AREA**

| **DATE** | **SURFACE AREA ($cm^2$)** | | **AREA HEALED ($cm^2$)** | | **% OF INITIAL AREA HEALED** | |
|---|---|---|---|---|---|---|
| | A | B | A | B | A | B |
| 31/12/86 | 12.21 | 9.79 | - | - | - | - |
| 06/01/87 | 3.83 | 6.20 | 8.38 | 3.59 | 68.63 | 36.67 |
| 16/01/87 | 0.47 | 2.18 | 11.74 | 7.61 | 96.15 | 77.73 |

A = EXPERIMENTAL WOUND (i.e. THE ULTRA-VIOLET IRRADIATED WOUND)

B = CONTROL WOUND

**TABLE 3: RATE OF HEALING PER DAY**

| **INITIAL SURFACE AREA ($cm^2$)** | | **FINAL SURFACE AREA ($cm^2$)** | | **SURFACE HEALED ($cm^2$)** | | **RATE OF HEALING / DAY ($cm^2$/DAY)** | |
|---|---|---|---|---|---|---|---|
| A | B | A | B | A | B | A | B |
| 12. 21 | 9. 79 | 0. 47 | 2. 18 | 11. 74 | 7. 61 | 0.7 | 0.4 |

A = EXPERIMENTAL WOUND (i.e. THE ULTRA – VIOLET IRRADIATED WOUND)

B = CONTROL WOUND

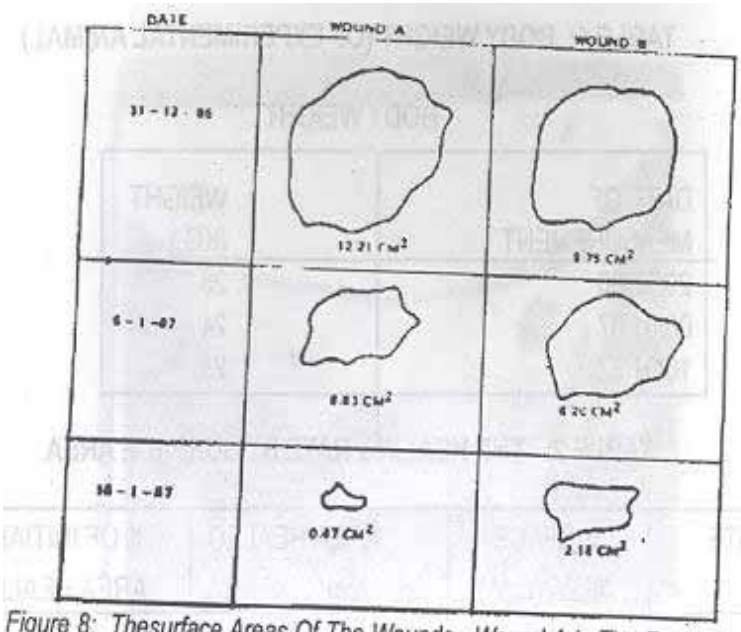
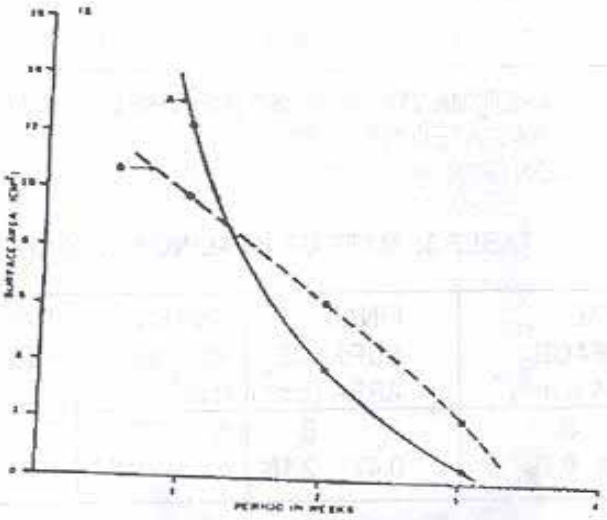



*Figure 8: Thesurface Areas Of The Wounds. Wound A Is The Experimental Wound While Wound B Is The Control Wound*



*Period In Weeks*

*Figure 9: The Rate Of The Healing Of Wounds And B Wound A Is The Experimental Wound While Wound B Is The Control Wound*

Another elaborate and fascinating study was on:

CARDIO-VASCULO-RESPIRATORY RESPONSES OF ADULTS IN DIFFERENT OCCUPATIONS TO PHYSICAL STRESS

BY

**ISAAC O. OWOEYE**

The objectives of this study were to investigate the Cardio-vasculo-respiratory changes of people of different occupations at rest and in response to a standardize physical stress. The effect of physical training on these variables in one group of the subjects was also investigated.

In all, 30 subjects, divided into three equal groups according to their occupations were studied. The imposed standardized physical stress was in the form of a three minute step test. In order to investigate the effectiveness of physical training on the variables of interest, one of the three groups was given a course of three-week intensive physical training. Thereafter, the cardio-vasculo-respiratory changes of the subjects at rest and in response to physical stress were re-assessed.

The cardio-vasculo-respiratory responses of the subjects were found to be different for the three groups. Age and level of physical activities of the subjects were implicated for the differences. For almost every variable studied, the computed "t"-statistics in respect of the pre-and post-training responses to physical stress was found significant ($P < 0.01$). Generally, the results indicated that physical training effected significant changes in the cardio-vasculo-respiratory responses to physical stress.

In order to prevent cardio-vasculo-respiratory accidents, the results of this study therefore established the need for every physically inactive adult to engaged in some form of regulated physical training (Plates 1 – 19; Table 1 – 11; Figures 1 – 4).

KEY WORDS

- HEART RATE
- BLOOD PRESSURES
- RESPIRATORY RATE
- OXYGEN CONSUMPTION
- PHYSICAL STRESS

# CARDIO-VASCULO – RESPIRATORY RESPONSES OF ADULTS IN DIFFERENT OCCUPTIONS TO PHYSICAL STRESS.

BY

ISAAC O. OWOEYE

*Plate 1: Measurement Of The Heart Rates Of One Subject From Group I*

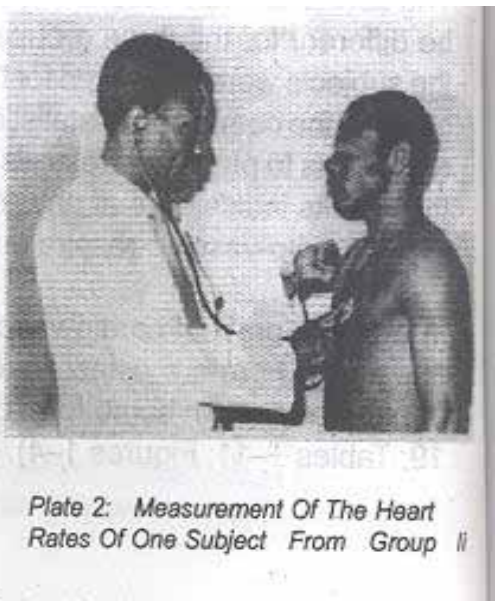


*Plate 2: Measurement Of The Heart Rates Of One Subject From Group II*

*Plate 3: Measurement Of The Blood Pressures With The Aid Of A Sphy-Gmomanometer Of One Subject From Group I.*

*Plate 4: Measurement Of The Blood Pressures With The Aid Of A Sphygmomanometer Of One Subject From Group II*

*Plate 5: The Stepping Exercise: The Initial Starting Posture Of One Subject From Group I*

*Plate 6: The Stepping Exercise: The First Step Up Of One Subject From Group I*

*Plate 7: The Stepping Exercise: The Second Step Up Of One Subject From Group I*

*Plate 8: The Stepping Exercise: The First Step Down Of One Subject From Group I*

*Plate 9: The Stepping Exercise: The Second Step Down Of One Subject From Group I.*

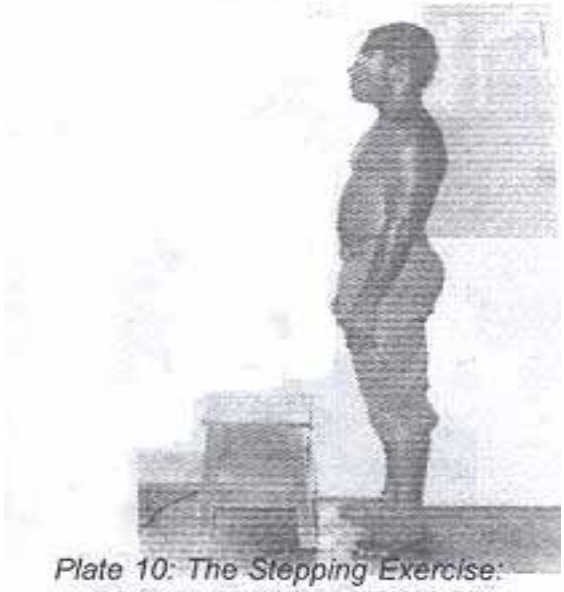


*Plate 10: The Stepping Exercise: The Initial Starting Posture Of One Subject From Group Ii.*

*Plate 11: The Stepping Exercise: The First Step Up Of One Subject From Group Ii.*

*Plate 12: The Stepping Exercise: The Second Step Up Of One Subject From Group Ii.*

*Plate 13: The Stepping Exercise: The First Step Down Of One Subject From Group Ii. Subject*

*Plate 14: The Stepping Exercise: The Second Step Down Of One From Group Ii.*

***Plate 15:** Squatting And Standing **Exercise:** The Initial Starting **Posture.***

*Plate 16: Squatting And Standing Exercise: The Squatting Down.*

*Plate 17: Squatting And Standing Exercise: The Standing Up.*

*Plate 18: Physical Training On Bicycle Ergometer Of A Subject (Group I).*

*9 19: Electrical Stimulation Of A Subject (Group I).*

**Table 1: The Heart Rates at Rest and in Response to Physical Stress**

| S/N | Group I (Pre-Training) | | Group II | | Group III | | |
|---|---|---|---|---|---|---|---|
| At Rest | In Stress | | At Rest | In Stress | At Rest | In Stress | |
| 1 | 68 | | 128 | 68 | 124 | 74 | 148 |
| 2 | 64 | | 132 | 68 | 136 | 72 | 156 |
| 3 | 64 | | 140 | 68 | 148 | 72 | 164 |
| 4 | 64 | | 144 | 70 | 152 | 72 | 172 |
| 5 | 68 | | 156 | 72 | 156 | 74 | 176 |
| 6 | 72 | | 160 | 72 | 172 | 76 | 180 |
| 7 | 72 | | 170 | 72 | 172 | 76 | 188 |
| 8 | 72 | | 176 | 76 | 176 | 76 | 188 |
| 9 | 76 | | 184 | 74 | 184 | 76 | 190 |
| 10 | 72 | | 188 | 80 | 188 | 76 | 192 |
| | M= | 60.20 | 158.00 | 72.00 | 160.00 | 74.00 | 175.00 |
| | SD= | 4.24 | 21.93 | 3.89 | 21.06 | 1.89 | 15.26 |

M = Mean
SD = Standard Deviation

**Table 2: The Respiratory Rates (per minute) at Rest and in Response to Physical Stress**

| S/N | Group I (Pre-Training) | Group II | Group III | | | |
|---|---|---|---|---|---|---|
| | At Rest | In Stress | At Rest | In Stress | At Rest | In Stress |
| 1 | 18 | 42 | 16 | 40 | 18 | 48 |
| 2 | 18 | 42 | 16 | 42 | 18 | 44 |
| 3 | 16 | 40 | 20 | 42 | 16 | 56 |
| 4 | 18 | 40 | 20 | 42 | 16 | 48 |
| 5 | 22 | 36 | 20 | 54 | 16 | 64 |
| 6 | 22 | 42 | 20 | 54 | 16 | 43 |
| 7 | 22 | 64 | 20 | 54 | 16 | 66 |
| 8 | 22 | 54 | 20 | 45 | 16 | 54 |
| 9 | 22 | 42 | 20 | 54 | 16 | 54 |
| 10 | 22 | 54 | 20 | 42 | 16 | 60 |
| M= | 20.2 | 46.0 | 19.2 | 46.9 | 16.40 | 54.00 |
| SD= | 2.4 | 8.7 | 1.7 | 6.6 | 0.94 | 7.4 |

M = Mean
SD = Standard Deviation

**Table 3: The Efficiency of Cardiovascular Adjustment to Physical Stress**

| S/N | Group I (Pre-Training) | | | Group II | | | Group III | | |
|---|---|---|---|---|---|---|---|---|---|
| | STHR | NMHR | 90% TNMHR-STHR | STHR | NMHR | 90% TNMHR | STHR | NMHR | 90% TNMHR |
| 1 | 128 | 199 | -51 | 124 | 203 | -59 | 143 | 200 | -50 |
| 2 | 132 | 200 | -43 | 136 | 191 | -36 | 156 | 190 | -15 |
| 3 | 140 | 197 | -37 | 148 | 200 | -32 | 164 | 188 | -15 |
| 4 | 144 | 198 | -34 | 152 | 195 | -24 | 172 | 187 | +4 |
| 5 | 156 | 197 | -21 | 156 | 194 | -19 | 176 | 187 | +8 |
| 6 | 160 | 198 | -18 | 172 | 193 | -2 | 180 | 199 | +1 |
| 7 | 176 | 197 | -1 | 172 | 192 | -1 | 188 | 195 | +13 |
| 8 | 176 | 197 | -1 | 176 | 191 | +4 | 188 | 189 | +19 |
| 9 | 184 | 196 | +8 | 184 | 187 | +19 | 190 | 188 | +21 |
| 10 | 188 | 195 | +13 | 188 | 196 | +12 | 192 | 186 | +25 |

STHR = Step-Test Heart Rate
NMHR = Normal Maximum Heart Rate
TNMHR = Threshold Level of Normal Maximum Heart Rate

**Table 4: The Oxygen Consumption Rates (i.e. max. VO2 ml.kg$^{-1}$Min$^{-1}$) in Response to Physical Stress**

| S/N | Group I | Group II | Group III |
|---|---|---|---|
| 1 | 57.6 | 42.9 | 49.2 |
| 2 | 55.9 | 54.2 | 45.8 |
| 3 | 40.0 | 49.2 | 42.5 |
| 4 | 50.9 | 47.5 | 39.1 |
| 5 | 45.8 | 37.0 | 37.4 |
| 6 | 36.3 | 34.0 | 32.6 |
| 7 | 33.3 | 39.1 | 31.1 |
| 8 | 37.4 | 37.4 | 32.4 |
| 9 | 31.8 | 34.1 | 31.5 |
| 10 | 32.4 | 32.4 | 30.7 |
| M | 42.14 | 40.78 | 37.23 |
| SD | 9.99 | 7.38 | 6.72 |

**Table 5: Effect of physical training on the heart rates at rest and in response to physical stress among college students**

| S/N | HEART RATES AT REST | | HEART RATES IN STRESS | |
|---|---|---|---|---|
| | Pre-Training | Post-Training | Pre-Training | Post-Training |
| 1 | 88 | 64 | 128 | 124 |
| 2 | 64 | 64 | 132 | 128 |
| 3 | 64 | 64 | 140 | 132 |
| 4 | 64 | 64 | 144 | 136 |
| 5 | 68 | 68 | 156 | 140 |
| 6 | 72 | 76 | 160 | 152 |
| 7 | 72 | 76 | 176 | 160 |
| 8 | 72 | 68 | 176 | 160 |
| 9 | 76 | 70 | 184 | 168 |
| 10 | 72 | 76 | 188 | 172 |
| M = | 69.20 | 69.00 | 158.00 | 147.00 |
| SEM = | 1.34 | 1.67 | 6.94 | 5.49 |
| SD = | 4.24 | 5.27 | 21.93 | 17.36 |
| r = | 0.88 | 0.99 | | |
| SED = | 0.81 | 1.67 | | |
| t = | 0.25* | 6.71** | | |

*Not significant at 0.05 level of significance
**P < 0.01

**Table 6: Effect of Physical Training on the Respiratory Rates at Rest and in Response to Physical Stress among College Students**

| S/N | RESPIRATORY RATES AT REST | | RESPIRATORY RATES IN STRESS | |
|---|---|---|---|---|
| | Pre-Training | Post-Training | Pre-Training | Post-Training |
| 1 | 18 | 18 | 42 | 42 |
| 2 | 18 | 18 | 42 | 36 |
| 3 | 16 | 16 | 40 | 40 |
| 4 | 18 | 18 | 40 | 36 |
| 5 | 22 | 20 | 36 | 36 |
| 6 | 22 | 20 | 42 | 36 |
| 7 | 22 | 22 | 64 | 54 |
| 8 | 22 | 22 | 54 | 48 |
| 9 | 22 | 22 | 42 | 36 |
| 10 | 22 | 22 | 54 | 42 |
| M = | 20.2 | 19.8 | 46.00 | 41.00 |
| SEM = | 0.76 | 0.70 | 2.75 | 1.96 |
| SD = | 2.40 | 2.21 | 8.70 | 6.20 |

| | | | |
|---|---|---|---|
| r | = | 0.82 | 0.92 |
| SED | = | 0.40 | 1.31 |
| t | = | 1.00* | 3.82** |

*Not significant at 0.05 level of significance
**P < 0.01

**Table 7: Effect of Physical Training on Oxygen consumption in Response to Physical Stress among College Students**

| S/N | Pre-Training Max. $VO_2$ in response to stress | Post-Training Max. $VO_2$ in response to stress |
|---|---|---|
| 1 | 57.6 | 59.3 |
| 2 | 55.9 | 57.6 |
| 3 | 40.0 | 41.4 |
| 4 | 50.9 | 54.2 |
| 5 | 45.8 | 52.5 |
| 6 | 36.3 | 37.7 |
| 7 | 33.3 | 36.3 |
| 8 | 37.4 | 44.1 |
| 9 | 31.8 | 39.1 |
| M = | 42.14 | 45.70 |
| SEM = | 3.09 | 2.95 |
| SD = | 9.77 | 9.32 |
| r = | 0.97 | |
| SED = | 0.74 | |
| t = | 4.80* | |

*P <0.01

**Table 8: Blood Pressure at Rest and in Response to Physical Stress**

| S/N | Group III | | Group II | | Group I | | |
|---|---|---|---|---|---|---|---|
| | AR | IPS | AR | IPS | ARPrT | IPSPrT | IPSPoT |
| 1 | 118/78 | 160/86 | 116/76 | 158/80 | 120/80 | 160/84 | 148/82 |
| 2 | 120/80 | 170/88 | 118/76 | 160/80 | 120/80 | 162/82 | 150/82 |
| 3 | 118/78 | 162/86 | 120/80 | 160/84 | 118/76 | 160/80 | 146/78 |
| 4 | 118/78 | 160/84 | 120/80 | 166/86 | 118/76 | 160/80 | 148/78 |
| 5 | 120/80 | 172/90 | 120/80 | 162/84 | 110/70 | 150/76 | 140/74 |
| 6 | 118/76 | 164/84 | 110/74 | 150/78 | 120/80 | 166/86 | 150/82 |
| 7 | 120/80 | 172/90 | 118/76 | 160/80 | 120/80 | 164/84 | 146/80 |
| 8 | 120/80 | 170/86 | 120/80 | 166/86 | 110/76 | 154/806 | 148/78 |
| 9 | 118/78 | 166/84 | 110/70 | 152/72 | 118/76 | 162/82 | 150/78 |
| 10 | 120/80 | 170/88 | 118/76 | 160/80 | 110/76 | 156/82 | 140/80 |
| M= | 119/78.8 | 166.6/86.6 | 117/76.8 | 159.4/81.4 | 116.4/77.0 | 159.4/82 | 146.6/79 |
| SD= | 1/1.3 | 4.6/2.2 | 4.4/3.1 | 4.9/3.2 | 4.3/3.0 | 4.6/2.4 | 3.6/2 |

Where:

| | | |
|---|---|---|
| AR | = | At Rest |
| IPS | = | In Physical Stress |
| ARPrT | = | At Rest Pre-Training |
| IPSPrT | = | In Physical Stress Pre-Training |
| IPSPoT | = | In Physical Stress Post-Training |
| M | = | Mean |
| SD | = | Standard Deviation |

**Table 9: One-way Analysis of variance for the Systolic Blood Pressure in Response to Physical Stress**

| Source Square | Sum of Freedom (SS) | Degrees of Square (Df) | Means (MS) | F |
|---|---|---|---|---|
| Between Groups | 2052.27 | 2 | 1026.14 | 48.00* |
| Within Groups | 577.20 | 27 | 21.38 | |
| Total | 2629.47 | 29 | | |

*P < .001

**Table 10: One-way Analysis of Variance for the final Diastolic Blood Pressures in Response to Physical Stress**

| Source Square | Sum of Freedom (SS) | Degrees of Square (Df) | Means (MS) | F |
|---|---|---|---|---|
| Between Groups | 288.8 | 2 | 144.4 | 18.5* |
| Within Groups | 210.6 | 27 | 7.8 | |
| Total | 499.4 | 29 | | |

*P < .001

**Table 11: Comparison of the Pre- and Post-Training Blood Pressures in Response to Physical stress**

| S/N | SYSTOLIC BLOOD PRESSURE | | DIASTOLIC BLOOD PRESSURE | |
|---|---|---|---|---|
| | Pre-Training | Post-Training | Pre-Training | Post-Training |
| 1 | 160 | 148 | 84 | 82 |
| 2 | 162 | 150 | 86 | 82 |
| 3 | 160 | 146 | 80 | 78 |
| 4 | 160 | 148 | 80 | 78 |
| 5 | 150 | 140 | 76 | 74 |
| 6 | 166 | 150 | 86 | 82 |
| 7 | 164 | 146 | 84 | 80 |
| 8 | 154 | 148 | 80 | 78 |
| 9 | 162 | 150 | 82 | 78 |
| 10 | 156 | 140 | 82 | 80 |
| M = | 159.40 | 146.60 | 82.00 | 79.20 |
| SD = | 4.60 | 3.60 | 2.40 | 2.40 |
| SEM = | 2.15 | 1.68 | 1.12 | 1.12 |
| r = | 0.71 | 0.96 | | |
| SED = | 1.52 | 0.30 | | |
| t = | 8.42* | 9.33** | | |

*P < .001; **P < .001

Where: M = Mean; SEM = Standard Error of Mean
SD = Standard Deviation
r = Correlation Coefficient
SED = Standard Error of Difference
t = The “t” test or “t” statistics

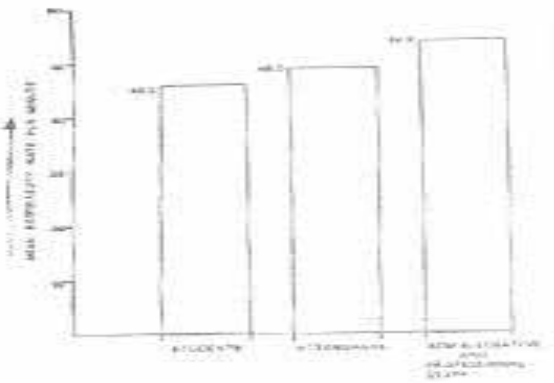


FIG. 1: THE RESPIRATORY RATE IN RESPONSE TO PHYSICAL STRESS

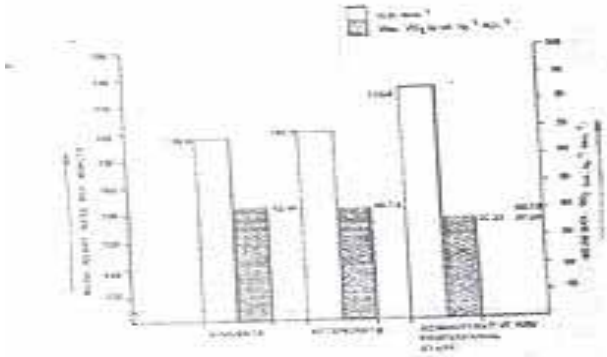


FIG. 2: THE HEART RATE AND THE OXYGEN CONSUMPTION IN RESPONSE TO PHYSICAL STRESS

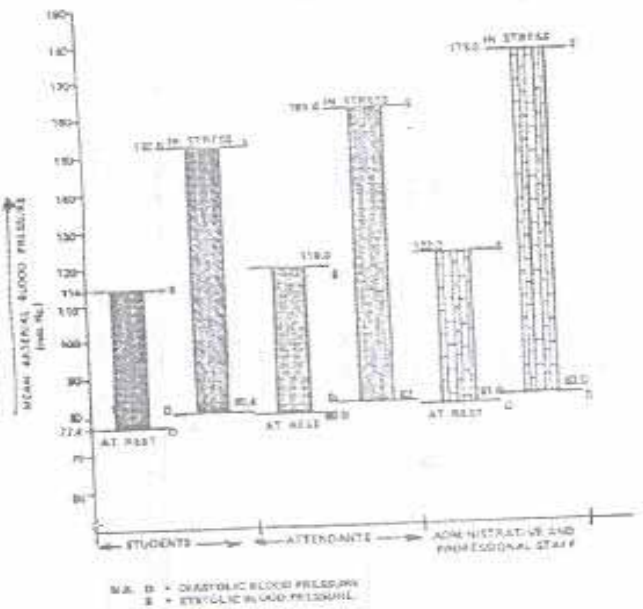
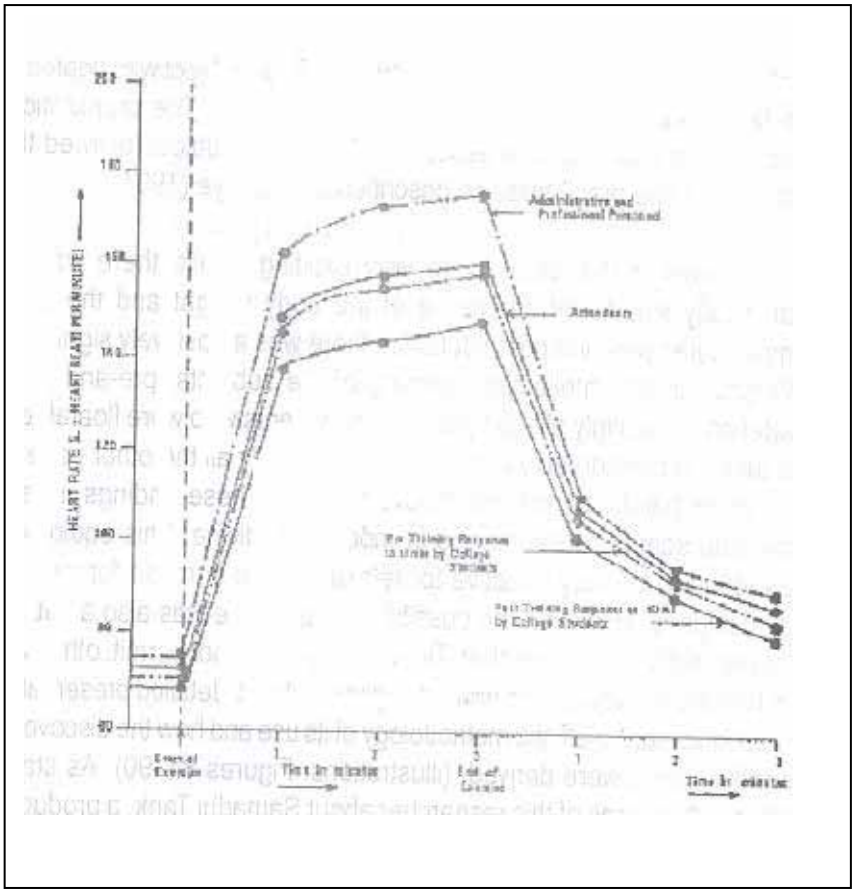



FIG. 3: BLOOD PRESSURE CHANGES TO PHYSICAL STRESS



## RESTRICTED ENVIRONMENTAL STIMULATION THERAPY

In the most recent time, a product of modern and advanced technology is SAMADHI TANK. This Tank was invented primarily to effect relaxation. This sophisticated, stylish and computerized equipment was imported to Nigeria by the Float cells Limited at Ikeja Plaza, Ikeja, Lagos, Nigeria.

In 1992, this researcher was invited to Ikeja Plaza, to study the equipment, the Samadhi Tank, the first of its kind in Africa. First of all, this researcher investigated the safety and possible abuse of the equipment. Thereafter, in 1992/93, the researcher carried out pioneer research studies using this equipment on such variables as hypertension, pulse rate, respiratory rate, body weight, effect on learning and on relief of some body pains of musculoskeletal origin such as neck pains and back pains.

In all, 17 subjects aged 25 – 27 were studied. Each subject was floated in the tank and studied over a period of four weeks. The preparation, procedure of floatation and assessments of each subject followed the instructions and procedures as described by Owoeye (1994).

The findings in that study were very exciting. While there was no statistically significant difference of the body weight and the body temperatures pre- and post-floatation, there was a positively significant difference in the intellectual learning of the subjects, pre-and post-floatation. Amazingly all the hypertensive patients who were floated in the tank got considerably improved while virtually all the other patients with other painful conditions recovered fully. These findings indeed constitute some break-through in modern medicine. This equipment was found to be very effective for relaxation, the purposes for which it was designed. However, the possibility of its abuse was also a subject investigated by this researcher. Time and space do not permit, otherwise this researcher would have wished to give a full and detailed presentation of the equipment itself, the methodology of its use and how the discovered benefits from it were derived,

(illustrations: Figures 84 – 90). As stated earlier, the findings of this researcher about Samadhi Tank, a product of most modern advanced technology are of great benefits to mankind. Although designed for relaxation, the findings of this researcher in connection with the variables studied constitute a break-through in modern medicine (Figure 1; Plates 1-5; Tables 1 – 12; Figures 2 –12).

**RESTRICTED ENVIRONMENTAL STIMULATION THERAPY: A NEW HEALTH TECHNOLOGY**

(A Presentation in a Workshop Session of the
WORLD CONFEDERATION FOR PHYSICAL THERAPY – 1995 CONGRESS

In Washington D. C., U. S. A.)

By
**ISAAC O. OWOEYE**

RESTRICTED ENVIRONMENTAL STIMULATION THERAPY:
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(A Presentation (Of Reg. No. 0012)
DURING THE
13TH INTERNATIONAL CONGRESS OF THE WORLD
CONFEDERATION FOR PHYSICAL THERAPY.

Held at the
CONFERENCE CENTRE,
Yokohama, Japan

On May, 23-28, 1999

by

**ISAAC O. OWOEYE**

Plate 1: The Samadhi Tank

Plate 2: Subject With Sizeable Loose Cotton Gown

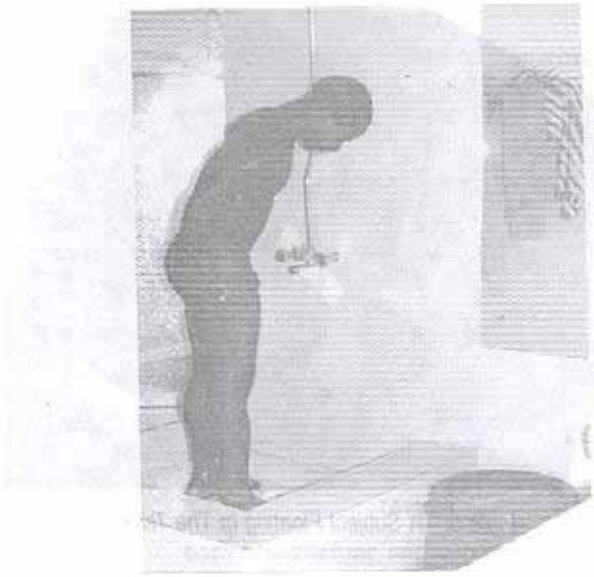

Plate 3: Subject Having A Bath In The Shower Room Prior To Floatat

Plate 4: Subject Entering The Tank

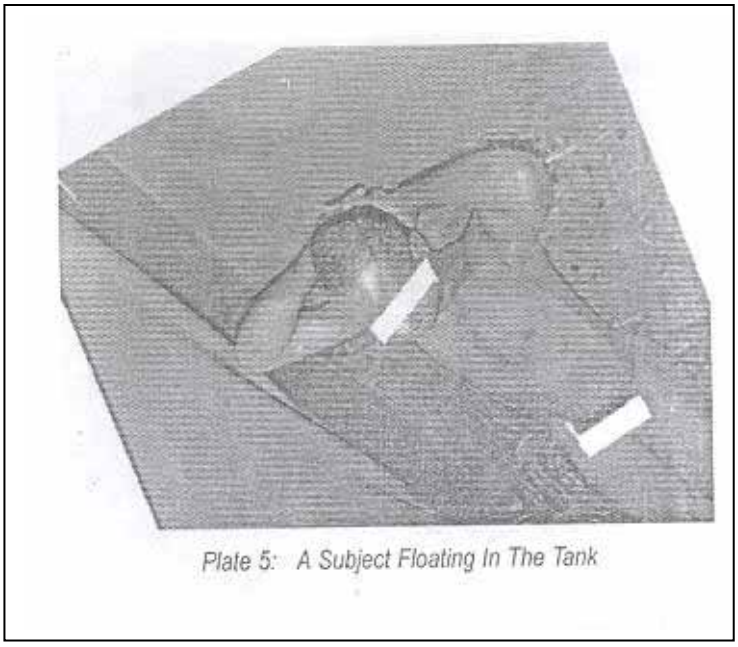

Plate 5: A Subject Floating In The Tank

**TABLE 1: MEDICAL CONDITIONS OF THE SUBJECTS**

| MEDICAL CONDITIONS | NO. OF SUBJECTS | % OF TOTAL |
|---|---|---|
| Intermittent Low Back Pain | 3 | 17.6 |
| Chronic Back Pain | 1 | 5.6 |
| Acute Back Pain | 2 | 11.8 |
| Neck Pain | 1 | 5.9 |
| Hypertension | 4 | 23.5 |
| Nil (i.e. No illness i.e. Normal Subject | 6 | 35.3 |
| Total | 17 | 100.00 |

**TABLE 2: BODY TEMPERATURE, PRE-AND POST – FLOATATION**

| S/NO | PRE-FLOATATION | POST-FLOATATION |
|---|---|---|
| 1 | 38.5 | 37.2 |
| 2 | 37.1 | 37.6 |
| 3 | 37.0 | 36.5 |
| 4 | 36.8 | 36.7 |
| 5 | 36.8 | 37.0 |
| 6 | 36.8 | 37.0 |
| 7 | 37.4 | 37.3 |
| 8 | 36.7 | 37.0 |
| 9 | 37.3 | 37.3 |
| 10 | 37.3 | 37.3 |
| 11 | 37.2 | 37.4 |
| 12 | 36.5 | 37.0 |
| 13 | 37.2 | 37.3 |
| 14 | 37.3 | 38.1 |
| 15 | 38.2 | 38.2 |
| 16 | 38.0 | 37.4 |
| 17 | 37.0 | 36.7 |
| M | 37.247 | 37.235 |
| SD | 0.542 | 0.499 |
| P | 0.4593 | |
| t | -0.100 | |

**TABLE 3: INITIAL PURSE RATE, PRE – AND POST-FLOATATION**

| S/NO | PRE-FLOATATION | POST-FLOATATION |
|---|---|---|
| 1 | 67 | 69 |
| 2 | 77 | 84 |
| 3 | 68 | 72 |
| 4 | 55 | 98 |
| 5 | 74 | 76 |
| 6 | 66 | 78 |
| 7 | 64 | 76 |
| 8 | 53 | 74 |
| 9 | 50 | 88 |
| 10 | 84 | 86 |
| 11 | 66 | 92 |
| 12 | 60 | 74 |
| 13 | 68 | 80 |
| 14 | 70 | 102 |
| 15 | 66 | 73 |
| 16 | 62 | 106 |
| 17 | 65 | 90 |
| M | 65.71 | 83.88 |
| SD | 8.44 | 11.60 |
| P | 0.0001 | |
| t | 5.07 | |

**TABLE 4:FINAL PULSE RATE, PRE AND POST-FLOATATION**

| S/NO | PRE-FLOATATION | POST-FLOATATION |
|---|---|---|
| 1 | 68 | 69 |
| 2 | 72 | 74 |
| 3 | 68 | 70 |
| 4 | 58 | 62 |
| 5 | 74 | 72 |
| 6 | 66 | 68 |
| 7 | 68 | 70 |
| 8 | 58 | 60 |
| 9 | 55 | 59 |
| 10 | 70 | 73 |
| 11 | 74 | 72 |
| 12 | 68 | 68 |

| | | |
|---|---|---|
| 13 | 71 | 70 |
| 14 | 72 | 71 |
| 15 | 70 | 70 |
| 16 | 68 | 70 |
| 17 | 69 | 72 |
| M | 67.59 | 68.82 |
| SD | 5.55 | 4.30 |
| P | 0.001 | |
| t | -2.65 | |

**TABLE 5: INITIAL RESPIRATORY RATE, PRE AND POST – FLOTATION**

| S/NO | PRE-FLOATATION | POST-FLOATATION |
|---|---|---|
| 1 | 22 | 26 |
| 2 | 23 | 21 |
| 3 | 24 | 26 |
| 4 | 19 | 28 |
| 5 | 21 | 25 |
| 6 | 16 | 24 |
| 7 | 20 | 24 |
| 8 | 16 | 10 |
| 9 | 19 | 25 |
| 10 | 26 | 28 |
| 11 | 22 | 24 |
| 12 | 20 | 24 |
| 13 | 18 | 24 |
| 14 | 21 | 25 |
| 15 | 20 | 22 |
| 16 | 19 | 24 |
| 17 | 20 | 24 |
| M | 20.35 | 24.41 |
| SD | 2.60 | 2.24 |
| P | 0.0001 | |
| t | 7.53 | |

**TABLE 6: FINAL RESPIRATORY RATE, PRE AND POST – FLOTATION**

| S/NO | PRE-FLOATATION | POST-FLOATATION |
|---|---|---|
| 1 | 20 | 18 |
| 2 | 19 | 17 |
| 3 | 23 | 22 |
| 4 | 19 | 19 |
| 5 | 19 | 16 |
| 6 | 21 | 20 |
| 7 | 22 | 22 |
| 8 | 21 | 20 |

| | | |
|---|---|---|
| 9 | 19 | 18 |
| 10 | 22 | 21 |
| 11 | 21 | 21 |
| 12 | 18 | 16 |
| 13 | 24 | 23 |
| 14 | 20 | 18 |
| 15 | 20 | 20 |
| 16 | 18 | 18 |
| 17 | 17 | 17 |
| M | 20.18 | 19.18 |
| SD | 1.88 | 2.16 |
| P | | 0.0004 |
| t | | -4.41 |

**TABLE 7: INITIAL BLOOD PRESSURES, PRE AND POST-FLOTATION**

| S/NO | PRE-FLOATATION | | POST - FLOATATION | |
|---|---|---|---|---|
| | SYSTOLIC BP($A_1$) | DIASTOLIC BP ($B_1$) | SYSTOLIC BP($B_2$) | DIASTOLIC |
| 1 | 110 | 71 | 118 | 72 |
| 2 | 111 | 59 | 120 | 60 |
| 3 | 120 | 84 | 150 | 84 |
| 4 | 140 | 94 | 150 | 94 |
| 5 | 138 | 100 | 186 | 130 |
| 6 | 130 | 88 | 150 | 100 |
| 7 | 180 | 100 | 188 | 130 |
| 8 | 128 | 88 | 140 | 90 |
| 9 | 121 | 80 | 145 | 90 |
| 10 | 108 | 66 | 128 | 96 |
| 11 | 110 | 80 | 118 | 86 |
| 12 | 162 | 124 | 166 | 130 |
| 13 | 120 | 80 | 150 | 110 |
| 14 | 130 | 92 | 140 | 110 |
| 15 | 156 | 126 | 166 | 142 |
| 16 | 132 | 82 | 138 | 86 |
| 17 | 130 | 98 | 124 | 100 |
| M = | 190.35 | 88.94 | 146.06 | 100.59 |
| SD = | 20.61 | 17.72 | 20.90 | 22.28 |
| | $A_1$ | | $A_2$ | |
| P = | | 0.0001 | | |
| t = | | 6.92 | | |
| | $B_1$ | | $B_2$ | |
| P = | | | 0.0006 | |
| t | | | 4.08 | |

**TABLE 8: FINAL BLOOD PRESSURES, PRE AND POST – FLOTATION**

| S/NO | PRE-FLOATATION | | POST - FLOATATION | |
|---|---|---|---|---|
| | SYSTOLIC BP($A_1$) | DIASTOLIC BP ($B_1$) | SYSTOLIC BP($B_2$) | DIASTOLIC |
| 1 | 110 | 71 | 112 | 71 |
| 2 | 110 | 60 | 110 | 59 |
| 3 | 120 | 84 | 120 | 84 |
| 4 | 130 | 90 | 130 | 90 |
| 5 | 138 | 98 | 130 | 96 |
| 6 | 128 | 84 | 128 | 84 |
| 7 | 140 | 96 | 145 | 97 |
| 8 | 120 | 84 | 120 | 84 |
| 9 | 118 | 80 | 118 | 80 |
| 10 | 106 | 68 | 108 | 66 |
| 11 | 110 | 80 | 111 | 80 |
| 12 | 130 | 100 | 135 | 110 |
| 13 | 120 | 80 | 122 | 80 |
| 14 | 126 | 88 | 128 | 88 |
| 15 | 130 | 110 | 134 | 110 |
| 16 | 126 | 82 | 126 | 82 |
| 17 | 122 | 90 | 124 | 90 |
| M = | 122.24 | 85.00 | 123.59 | 85.35 |
| SD = | 9.35 | 12.24 | 10.01 | 13.40 |
| | $A_1$ | | $A_2$ | |
| P = | | 0.001 | | |
| t = | | -0.56 | | |
| | | $B_1$ | | $B_2$ |
| P = | | | 0.05 | |
| t | | | -2.88 | |

**TABLE 9: THE BODY WEIGHT (in Kg)**

| S/NO | PRE-FLOATATION | POST - FLOATATION | | | |
|---|---|---|---|---|---|
| | | 0 Mins | 5 Mins | 10 Mins | 15 Mins |
| 1 | 57.5 | 56.5 | 57.0 | 57.5 | 57.5 |
| 2 | 58.0 | 57.0 | 57.5 | 58.0 | 58.0 |
| 3 | 64.0 | 64.0 | 64.0 | 64.0 | 64.0 |
| 4 | 44.0 | 44.0 | 44.0 | 44.0 | 44.0 |
| 5 | 87.5 | 87.5 | 87.5 | 87.5 | 87.5 |
| 6 | 75.0 | 74.0 | 74.5 | 75.0 | 75.0 |
| 7 | 86.0 | 85.5 | 85.5 | 86.0 | 86.0 |
| 8 | 44.0 | 44.0 | 44.0 | 44.0 | 44.0 |
| 9 | 57.5 | 56.5 | 57.0 | 57.0 | 57.0 |
| 10 | 59.5 | 59.0 | 59.5 | 59.5 | 59.5 |
| 11 | 88.0 | 85.5 | 85.5 | 85.5 | 85.5 |
| 12 | 73.5 | 72.5 | 73.0 | 73.5 | 73.5 |
| 13 | 75.0 | 73.0 | 73.0 | 73.5 | 73.5 |

| | | | | | |
|---|---|---|---|---|---|
| 14 | 86.0 | 85.0 | 85.0 | 85.0 | 85.0 |
| 15 | 44.0 | 43.5 | 43.0 | 44.0 | 44.0 |
| 16 | 80.0 | 80.0 | 80.0 | 80.0 | 80.0 |
| 17 | 45.0 | 44.5 | 44.5 | 45.0 | 45.0 |

| | | | | | |
|---|---|---|---|---|---|
| M | = | 66.029 | 65.372 | 65.594 | 65.824 | 65.941 |
| SD | = | 16.249 | 16.121 | 16.145 | 16.103 | 16.177 |
| P | = | 0.0001 | 0.0007 | 0.0336 | 0.3056 | |
| t | = | -5.095 | -4.016 | -1.951 | -0.527 | |

**TABLE 10: EFFECT OF FLOATATION ON LEARNING**

| S/NO | PRE-FLOATATION SCORES (IN %) | POST-FLOATATION SCORES (IN %) |
|---|---|---|
| 1 | 7.3 | 21.3 |
| 2 | 15.5 | 35.8 |
| 3 | 6.0 | 24.5 |
| 4 | 22.4 | 33.3 |
| 5 | 13.0 | 26.0 |
| 6 | 19.3 | 26.7 |
| 7 | 25.0 | 42.0 |
| 8 | 22.0 | 45.0 |
| 9 | 11.5 | 38.5 |
| 10 | 15.0 | 47.5 |

| | | | |
|---|---|---|---|
| M | 15.7000 | | 36.060 |
| SD | 6.448 | | 9.190 |
| P | | 0.0001 | |
| t | | 7.600 | |

**TABLE 11: DEGREE OF RELAXATION EFFECTED BY FLOATATION**

| DEGREE OF RELAXATION | INITIAL TREATMENT | | FINAL TREATMENT | |
|---|---|---|---|---|
| | NO | % OF TOTAL | NO | % OF TOTAL |
| Not relaxed | 0 | 0 | 0 | 0 |
| Partially relaxed | 4 | 23.5 | 0 | 0 |
| Fully relaxed but partially awake | 11 | 78.6 | 5 | 29.4 |

| | | | | |
|---|---|---|---|---|
| Fully relax and deeply asleep | 2 | 11.8 | 12 | 70.6 |

**TABLE 12: THERAPEUTIC EFFECTS OF FLOATATION**

| ITEM | MEDICAL CONDITION | NO | PARTIAL RECOVERY | FULL RECOVERY |
|---|---|---|---|---|
| I | Intermittent Low Back Pain | 3 | 1 (i.e. 33. 3%) | 2 (i.e. 66.6%) |
| II | Chronic Back Pain | 1 | 1 (i.e. 100%) | - |
| III | Acute Back Pain | 2 | - | 2 (i.e. 100%) |
| IV | Neck Pain | 1 | - | 1 (i.e. 100%) |
| V | Hypertension | 4 | 4 (i.e. 1000%) | - |

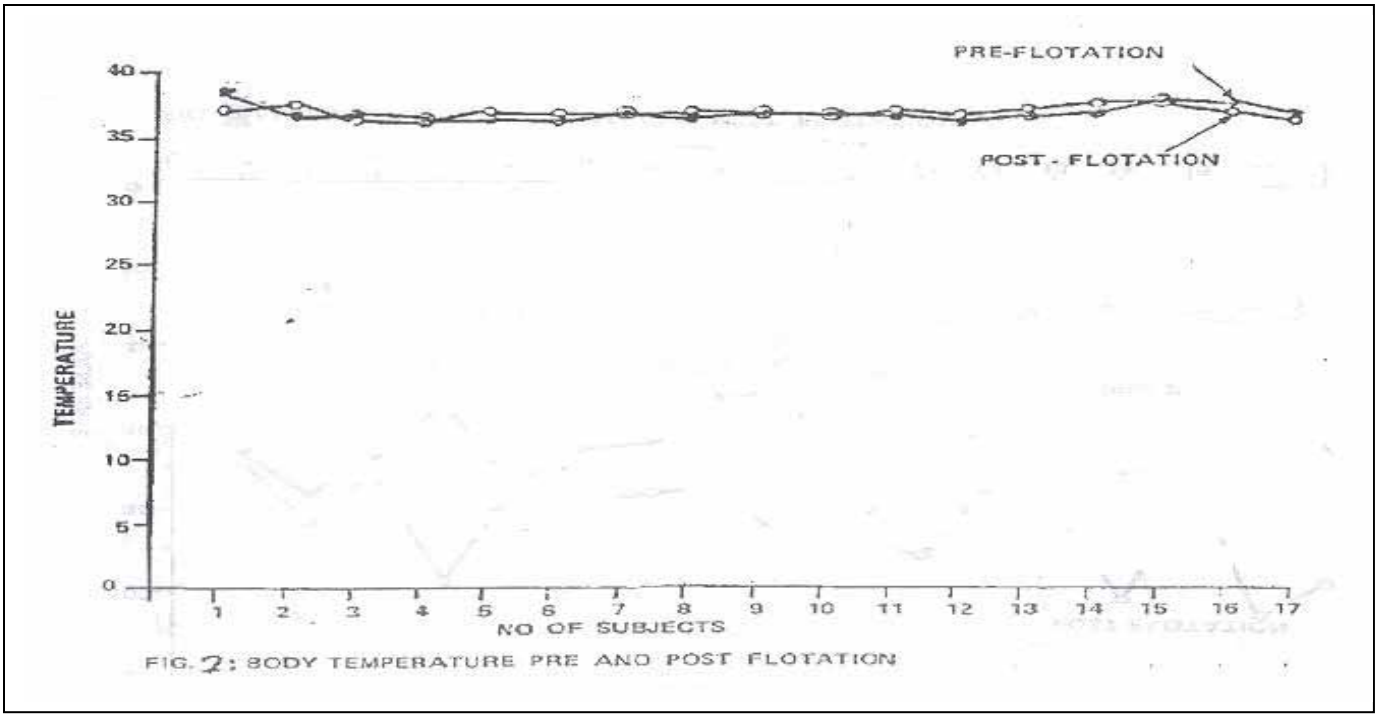

FIG. 2: BODY TEMPERATURE PRE AND POST FLOTATION

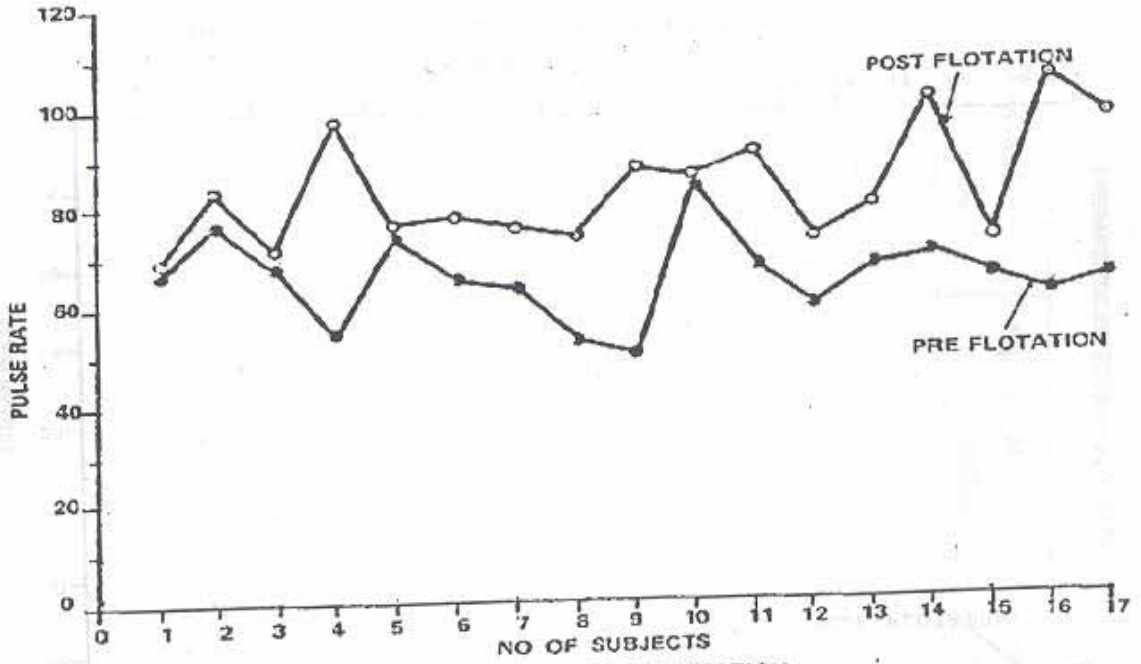


FIG. 3: INITIAL PULSE RATE PRE AND POST FLOTATION

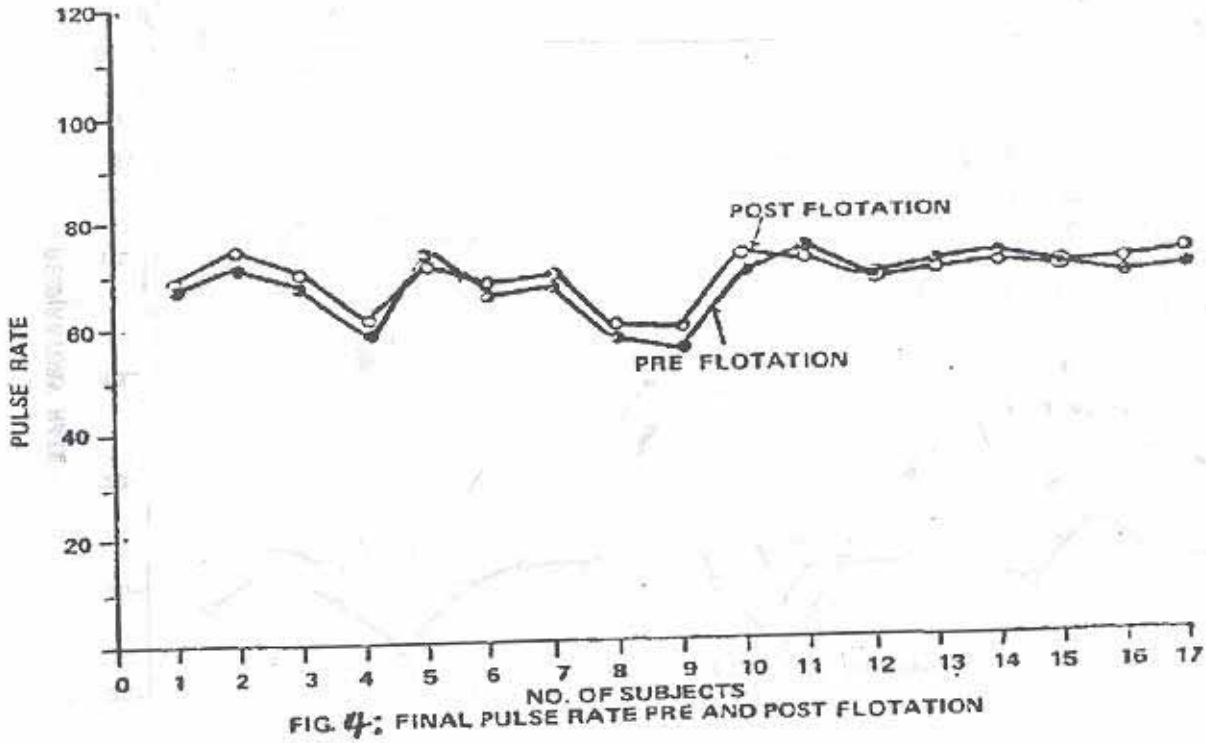


FIG. 4: FINAL PULSE RATE PRE AND POST FLOTATION

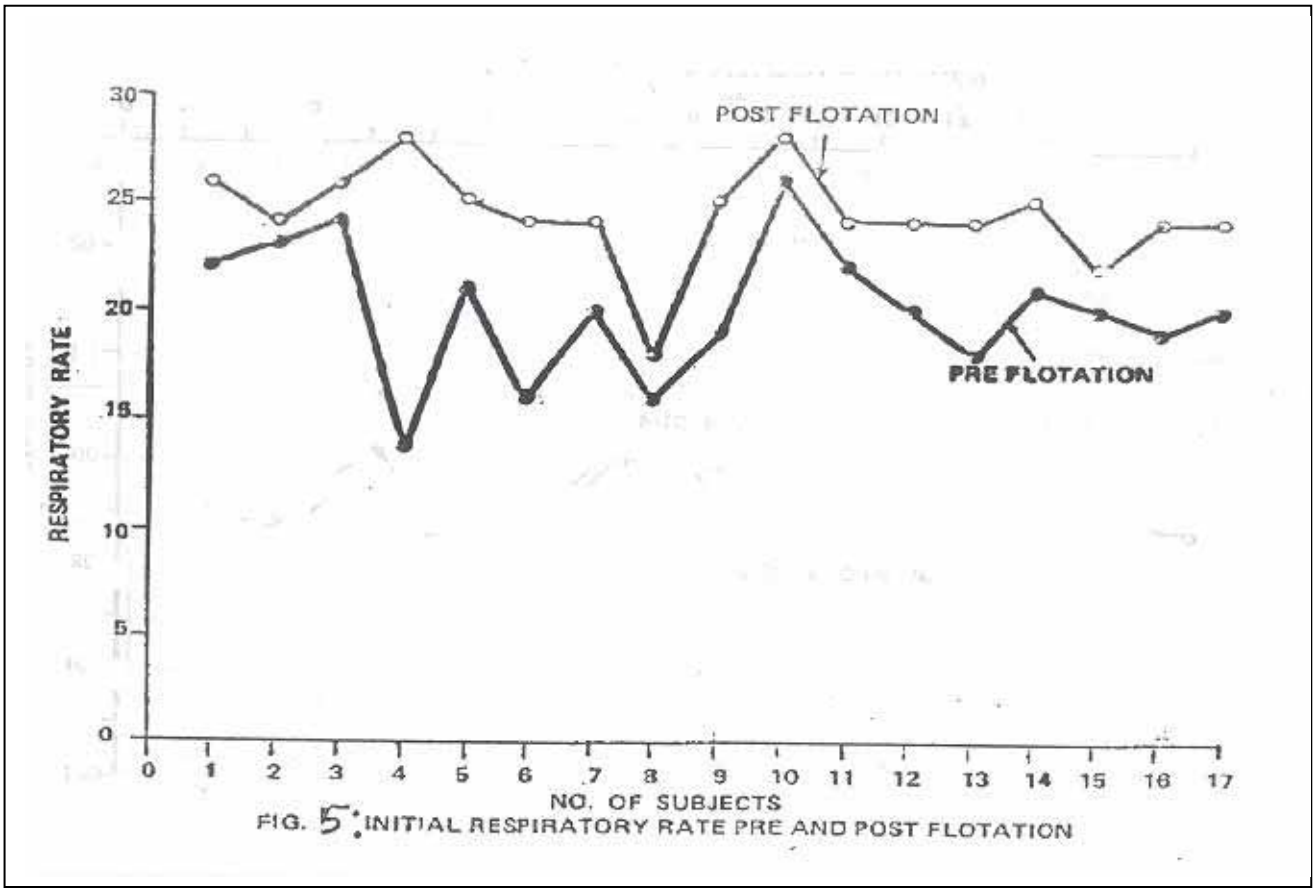


FIG. 5: INITIAL RESPIRATORY RATE PRE AND POST FLOTATION

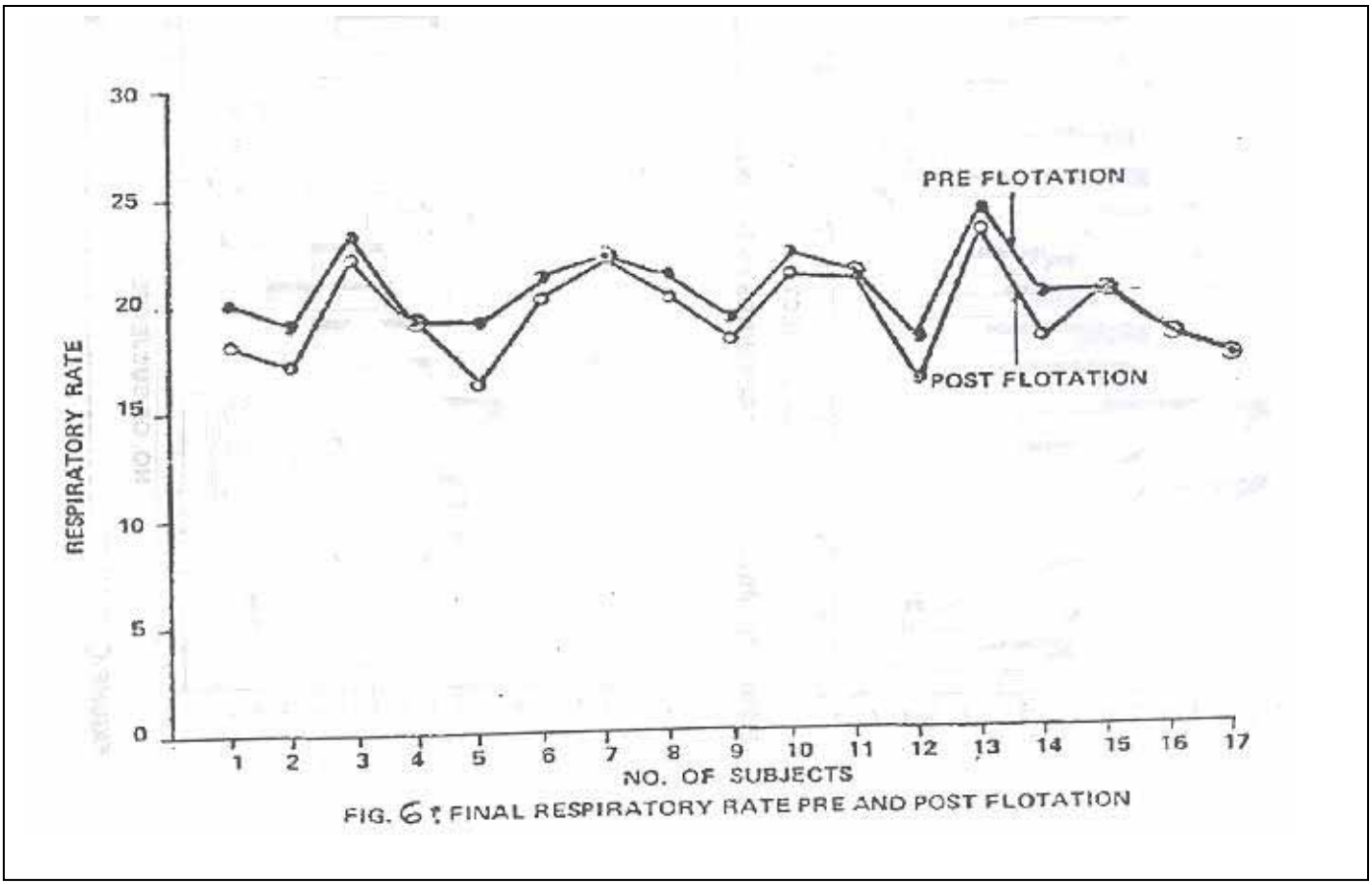


FIG. 6: FINAL RESPIRATORY RATE PRE AND POST FLOTATION

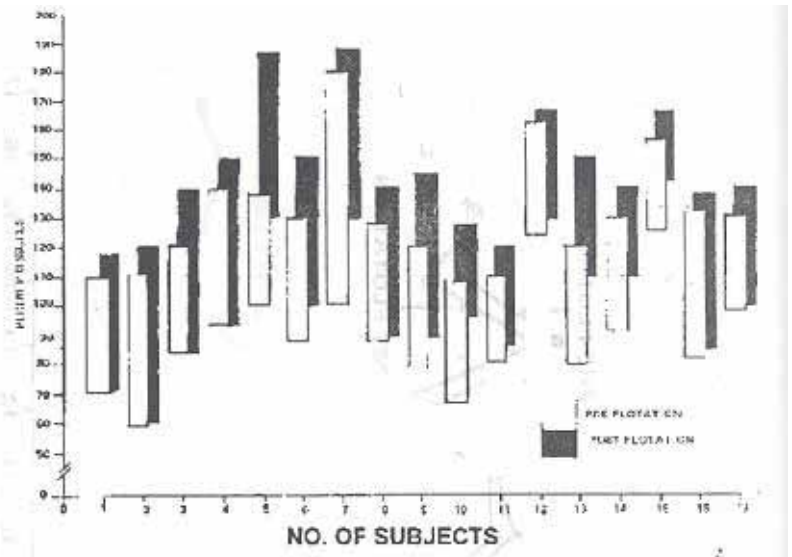


*FIGURE 7* INITIAL BLOOD PRESSURES PRE- POST FLOATATION

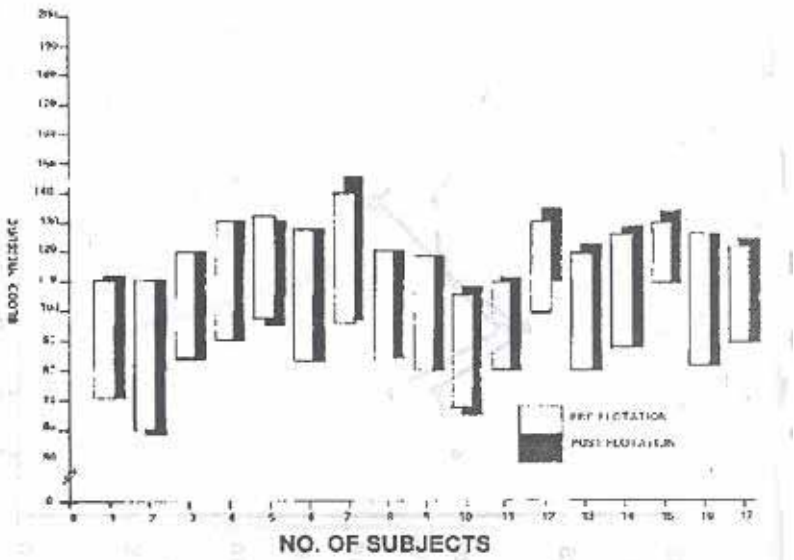


*FIGURE 8*: FINAL BLOOD PRESSURES PRE- AND POST-FLOATATION

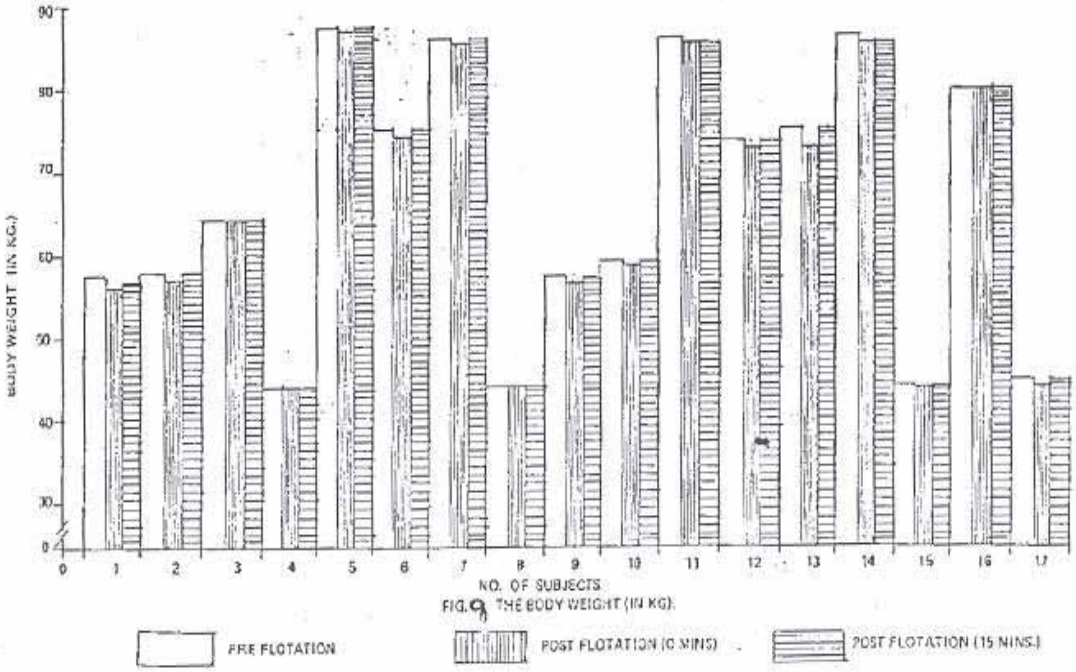


FIG.9 : THE BODY WEIGHT (IN KG).

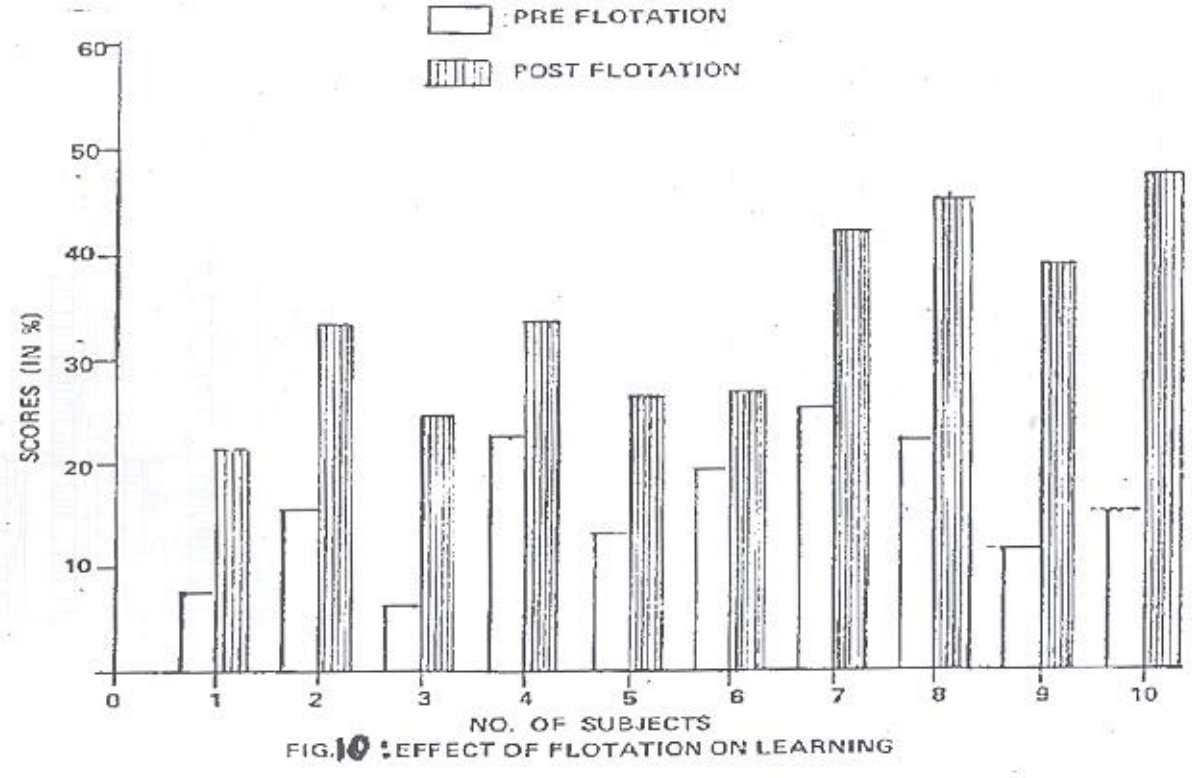


FIG.10 : EFFECT OF FLOTATION ON LEARNING

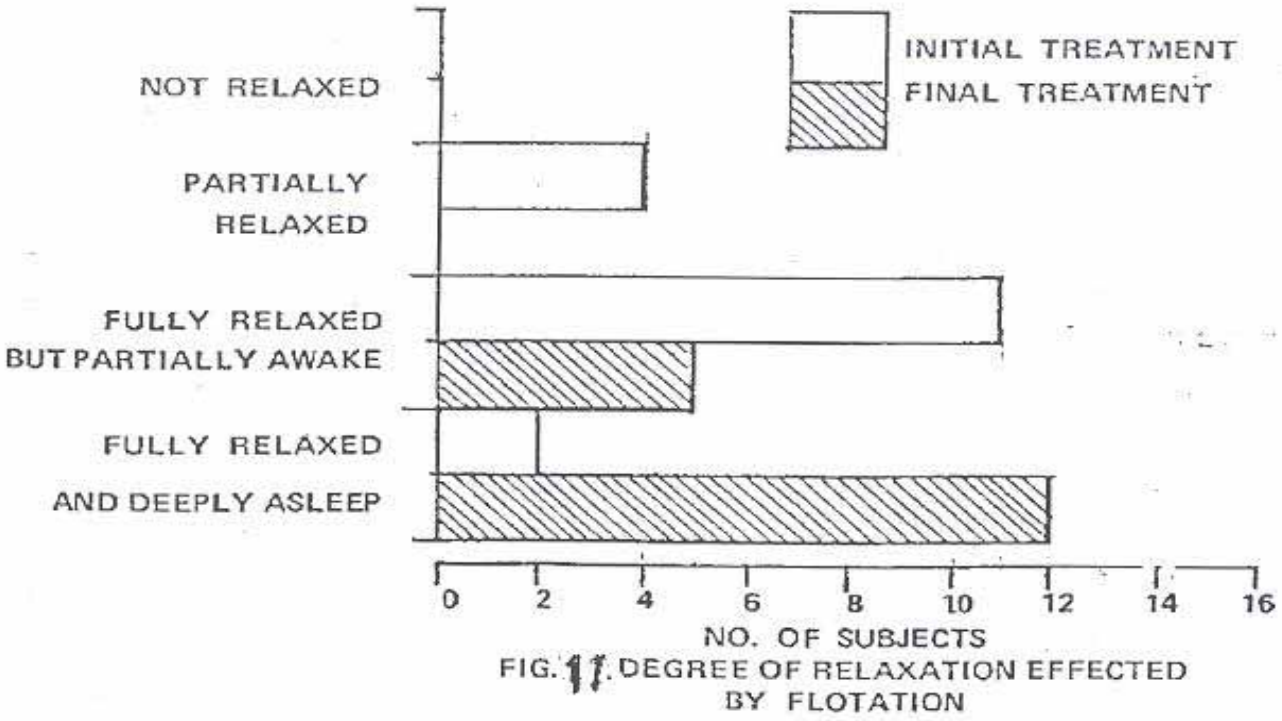

FIG. 11. DEGREE OF RELAXATION EFFECTED BY FLOTATION

**SUMMARY OF CONTRIBUTIONS TO KNOWLEDGE**

This researcher (i.e. Professor Isaac O. Owoeye) has contributed to the body of knowledge in Physiotherapy in several areas of specialties.

This researcher, for example, is the first Physiotherapists to undertake and invasive method using implanted electrodes to investigate the effectiveness of some electrical currents on collagenous regeneration in traumatic injury to tendons. For the first time also, this researcher established the scientific basis of skin sensation test as well as identified the best technique for its assessment in the physiotherapeutic specialty of thermo-therapy and electrotherapy.

Further notable contributions include the fact that this researcher is the first physiotherapist to evaluate the cardiovasculo respiratory responses of people of different occupations to standardized physical stress. He established how the systolic and diastolic

blood pressures can be predicted by the level of the physical fitness of the individual. Also, further established is how physical training can affect these variables and thus protect the individual. This researcher also identified the most effective procedures in the physical assessment and management of back pain.

A recent breakthrough in the capabilities of a new health technology was achieved by this researcher in his research investigations using the Samadhi Tank as the medium for Restricted Environmental Stimulation Therapy (REST). The effectiveness of this new equipment of modern technology for generalized relaxation, improvement in learning skills and for management of some painful conditions were identified by this researcher.

The cost-effectiveness of the management of traumatic open wounds by ultraviolet irradiation was recently established by this same researcher in a collaborative experimental research study.

This researcher, through his extensive work in Electrical Stimulations has contributed abundantly to the existing body of knowledge on the development and maintenance of muscular integrity and efficiency.

As an educator in Physiotherapy, this researcher has contributed abundantly to the growth and development in Physical Therapy. The Oath of Physiotherapy Practice which he produced as the author and which was published in 1985 was the first of its type and today this document is used across the nations of the world i.e. in placing the freshly qualified practitioners (i.e. in Physiotherapy) under Oath. Further, this researcher has contributed abundantly to development and writing of instructions in Physiotherapy. The Book: “ Community Physiotherapy” (128pp) which he (as an editor) published in 1986 happens to be the first Text Book of Community Physiotherapy ever published. Up till today this book serves as a reference Text-Book in Community Physiotherapy worldwide.

**RESEARCH PROJECTS SUPERVISED TO COMPLETION:**

1. Physical Management of Burns in the Lagos University Teaching Hospital, Lagos, Nigeria, - November 1979 to June 1980.

2. The Physiotherapeutic Management of Patients with Fractured Shaft of Femur in the Lagos University Teaching Hospital, Lagos, Nigeria – November 1979 – June, 1980.

3. Comparative Study of Skin Temperature changes due to Luminous and non-Luminous Infra-red Radiation. – October 1982 – June 1983.

4. The incidence of Low Back Pain among Lagos University Teaching Hospital Nurses – October 1982 – June 1983.

5. Effect of Ultraviolet Irradiation on Indolent Wounds, - October 1983 – June 1984.

6. Physiotherapeutic Management of Fractures of the Shaft of Femur at the Lagos University Teaching Hospital between January 1980 and December 1983.

7. The effect of Short-Wave Diathermy as compared to Infra-red Radiation on the Mobilization of Stiff Elbow Joint following Injuries to the Upper Limbs – October 1984 – June 1985.

8. Congenital Talipes Equinovarus: A review of cases seen at the Lagos University Teaching Hospital from 1980 to 1984.

9. Spinal Mobility: A Physical Assessment following Physiotherapy Management of uncomplicated Low Back Pain – January – July 1985.

10. The Pattern of Regional Distribution of Osteoarthritis and the forms of Management Administered in the Lagos University Teaching Hospital – January 1981 – December 1985.

11. A review of Lower Limb Deformities and their management in children aged 0 – 5 years at the Lagos University Teaching Hospital between January 1981 and December, 1985.

12. The Nature, Management and Rehabilitation of Flexor Tendon Injuries of the Hand as seen in the Lagos University Teaching Hospital from January 1981 to December 1985.

13. The Management of Osteomyelities at the Lagos University Teaching Hospital – October 1986 – June 1987.

14. The Incidence of Neck Pain in different ages and occupational groups in Lagos, Nigeria – October 1986 – June 1987.

15. The Nigerian Traditional Methods of Management of Fractures – October 1986 – June 1987.

16. Osteomyelitis: The Review Study of Cases seen at the Lagos University Teaching Hospital from January 1982 to December 1986.

17. A Review of Pelvic Fractures as seen in the Lagos University Teaching Hospital between January 1976 and January 1987.

18. The Effectiveness of the Management and Problems associated with Traumatic Fractures of the Upper Extremities (1987/88).

19. A review of cases of Foot Deformities in Children aged 0 – 10 years as seen in the Lagos University Teaching Hospital between January 1987 and December 1982, (1987/88)

20. The effectiveness of the Management and Problem associated with Traumatic Fractures of the Upper Extremities, (1987/88).

21. System Body Temperature changes following the application of Short wave Diathermy and non-Luminous Infra-red Radiation, (1988/89).

22. The Therapeutic Effectiveness of Deep Heat Spray compared to Deep Heat Rub in the Management of uncomplicated Low Back Pain (1988/89).

23. A Study of appropriate Furniture Dimensions for Secondary Schools in Lagos (1989/90)

24. Management of pain due to Spinal Spondylosis at Lagos University Teaching Hospital (1989/90)

25. Incidence of Low Back Pain and their management in the third trimester of pregnancy and after delivery (1989/90)

26. The effect of the Expanded Programme of Immunisation on the Incidence of Poliomyelitis as observed in the Lagos University Teaching Hospital between January 1980 and December 1989. A Review Study (1989/90)

27. Cardiovascular response in patients with cervical Spondylosis during Mechanical Cervical Traction (1990/91).

28. The management of shoulder pain of Musculo-Skeletal origin using pyoxican (Feldene Gel). (1990/91).

29. A Study of Low Back Pain among Bank Workers in Surulere, Lagos, (1991/92)

30. Review of the Incidence and Management of Fracture of Femur as seen in Lagos University Teaching Hospital between January 1984 and December 1991 and a Report of cases seen between January 1992 and March 1992, (1991/92).

31. A Comparative Study of the Effectiveness of Short Wave Diathermy and Infra – red Irradiation in the treatment of patients with Low Back Pain – (1992/94).

32. The Prevalence of Back pain amongst various categories of Nurses in the Lagos University Teaching Hospital – (1992/94).

33. Prevalence of Low Back Pain among the Factory Workers – (1992/94).

34. Postpartum Physiotherapeutic Procedures in the Management of Flabby Abdominal Muscle – (1992/94).

35. Guillain-Barre Syndrome: Physiotherapeutic Management at the Lagos University Teaching Hospital – (1994/95)

36. The Prevalence of Spinal Deformities in a School for Physically Handicapped Children.

37. Physiotherapy Management of Low Back Pain: a Case Study.

38. A Review of the Incidence, Aetiology and Management of Ankle Injury at the Lagos University Teaching Hospital between January, 1990 and December, 1995.

## I. RESEARCH PAPERS PRESENTED DURING SCIENTIFIC SEMINARS, WORKSHOPS AND CONFERENCES:

1. OWOEYE, I. O. The Role of Physiotherapy in Geriatrics.
(A Paper presented during the Inaugural Physiotherapy Week of the Association of Undergraduate Physiotherapists, University of Ibadan at the New Medical School Lecture Theatre, U. C. H., Ibadan, February 23, 1977).

## II. PAPERS PRESENTED IN VARIOUS SEMINARS AT THE DEPARTMENT OF HEALTH SCIENCES, LONG ISLAND UNIVERSITY, NEW YORK, U.S.A.

2. OWOEYE, I. O. Poliomyelitis as the most prominent Neurological Disorder within the Tropics in Africa (December, 1978).

3. OWOEYE, I. O. Cardiovascular Changes in Endurance Type of Exercises, (January, 1979).

4. OWOEYE, I. O. The Weakness of Lumbosacral Joint, (March, 1979)

5. OWOEYE, I. O. Biomechanics of the Elbow Joint, (April, 1979).

6. OWOEYE, I. O. Low Back Pain: Aetiology and Management, (April 1979).

**III. PROFESSIONAL CONFERENCE:**

7. OWOEYE, I. O. Physical Management of Herniated Nucleus Pulposus of the Lumbar Interverebral Disc.
(A Paper presented during the 5th Annual Conference of the Nigeria Society of Physiotherapy at Palm Royal Motel, Benin City, Nigeria. (May 1 – 4, 1980).

**IV. PAPERS PRESENTED DURING VARIOUS SEMINARS WHILE AT THE NEW YORK UNIVERSITY, NEW YORK, U. S. A.:**

8. OWOEYE, I. O. Changes in Tibiotalar Area of Contact caused by Lateral Talar Shift, (January, 1981).

9. OWOEYE, I. O. Electromyographic Biofeedback in Patients of Cerebrovascular Accidents: Effect of Motivation. (January, 1981).

10. OWOEYE, I. O. Factors influencing Neural Connectivity. (May, 1981).

11. OWOEYE, I. O. Major and Secondary Risk Factors associated with Development of Coronary Heart Diseases, (May, 1981).

12. OWOEYE, I. O. Maintenance of Muscular Integrity and Restoration of Power in Traumatically Denervated Skeletal Muscles, (May, 1981).

13. OWOEYE, I. O. Analysis of Posture and Body Type in Relation to Electromyographic Activity of the Lower Trunk Muscles, (May, 1981).

14. OWOEYE, I. O. Relevance of Socio – economic Status to the Habit of Living and its consequence on Health. (January, 1982.)

15. OWOEYE, I. O. The Components of Physical Therapy, (January, 1982).

16. OWOEYE, I. O. Current and Future Research in Physical Therapy, (January, 1982).

17. OWOEYE, I. O. The Therapeutic Effect of Heat on Isometric Strength of the Quardriceps Femoris Muscle, (May, 1982.)

## V. PAPERS PRESENTED AT SCIENTIFIC SEMINARS, CONFERENCES AND RESEARCH MEETINGS:

18. OWOEYE, I. O. The Therapeutic Effect of Galvanic Current following Rupture of the Achilles Tendon.
(A Paper presented in honour of a visiting Egyptian Medical Delegation to the College of Medicine of the University of Lagos during a special Interdisciplinary Research Meeting held in the Old Great Hall of the College of Medicine, University of Lagos, (January 21, 1983.)

19. OWOEYE, I. O. Thermal Sensation, the Basis for the Skin Sensation Test in Electrotherapy and Thermal Therapy.
(A Paper presented at the VIIIth Annual Conference and Seminar of Nigeria Society of Physiotherapy held in Jos, Nigeria, April 26 – 30, 1983).

20. OWOEYE, I. O. Further Expanded Roles of Physiotherapy in the Basic Primary Health Care for the Nigeria community.
(A Paper presented at the VIIIth Annual Conference and Seminar of Nigeria Society of Physiotherapy held in Jos, Nigeria. April 26 – 30, 1983.

21. OWOEYE, I. O. Pulsed Galvanic Current: Effectiveness in the Collaginous Regeneration following Traumatic Rupture of the Achilles Tendon.
(A Paper presented at the VIIIth Annual conference and Seminar of Nigeria Society of Physiotherapy held in Jos, Nigeria, April 26 - 30, 1983).

22. OWOEYE, I. O. Adequate Utilization of our Naturally Endowed Resources.
(A Paper presented at the VIIIth Annual conference and Seminar of Nigeria Society of Physiotherapy held in Jos, Nigeria, April 26 - 30, 1983).

23. OWOEYE, I. O. Rehabilitation of the Traumatised Patient.
(A Paper presented at the 4th Annual Scientific Conference of the Association of Resident Doctors of the Lagos University Teaching Hospital, held at the Old Great Hall of the College of Medicine, University of Lagos, December 2, 1983.)

24. OWOEYE, I. O. Physiotherapy in the Eighties.
(A Paper presented at the 3rd National Congress of the Nigeria Association of Physiotherapy Students at the New Lecture Theatre, College of Medicine, University of Ibadan, U. C. H., Ibadan, March 30, 1984).

25. OWOEYE, I. O. Call for Selfless Service.
(A Keynote Address presented at the Ninth Annual Conference and Seminar of the Nigeria Society of Physiotherapy, held in Akure, Ondo State, Nigeria, November 7 – 11, 1984).

26. OWOEYE, I. O. Glimpses of the Future Trend of Development in Physiotherapy.
(A Paper presented at the Ninth Annual Conference and Seminar of the Nigeria Society of Physiotherapy held in Akure, Ondo State, Nigeria November 7 – 11, 1984).

27. OWOEYE, I. O. The Frontiers of Physiotherapy in Primary Health Care in Nigeria
(A Paper presented at the Ninth Annual Conference and Seminar of the Nigeria Society of Physiotherapy held in Akure, Ondo State, Nigeria, November 7 – 11, 1984).

28. OWOEYE, I. O. The Role of Physiotherapists in Industries.
(A Paper presented during the Formal Launching Ceremony of the Oyo State Chapter of the Nigeria Society of Physiotherapy held in the New Auditorium of the College of Medicine, University of Ibadan, U. C. H., Ibadan, December 5 – 7, 1984).

29. OWOEYE, I. O. Lumbago: Manipulations and other Physical Managements of the Painful Back. Theoretical, Practice and Clinical presentations in a Seminar and In – Service Course in the Department of Physiotherapy, Institute of Health, Ahmadu Bello University Teaching Hospital, Zaria, Nigeria, January 17 – 19, 1985.

(During this Seminar and In-Service Course, this author delivered two lectures, gave two clinical demonstration sessions and conducted two clinics during which immediate symptomatic reliefs were reported by the patients treated.)

30. OWOEYE, I. O. Cardiovasculo Respiratory Responses to Physical Stress: An Anvil with which to Forge Sound Physical Health for All by the Year 2000.
(A Paper presented during the 1985 Annual Conference/Seminar and Silver Jubilee Celebrations of the Nigeria Society of Physiotherapy held in Lagos, Nigeria, June 2 – 8, 1985)

31. OWOEYE, I. O. Nigeria Society of Physiotherapy has Come of Age.
(A Paper presented during the 1985 Annual conference/Seminar and Silver Jubilee Celebrations of the Nigeria Society of Physiotherapy, held in Nigeria, June 2 – 8, 1985).

32. OWOEYE, I. O. An Address titled:

"Silver Jubilee Meritorious Award" including the Citations of Mr. C. A. Ajao, the Award Winner.
(A Paper presented during presentation of the Silver Jubilee Meritorious Award of Nigeria Society of Physiotherapy in Lagos, Nigeria, June 8, 1985).

33. OWOEYE, I. O. the Role of Medical Rehabilitation in Nigeria's Health Care Delivery.
(An Invited Paper delivered during a Conference on: "The Role of Health Sciences and Investigative Medicine in Nigeria's Health Care Delivery" sponsored by the Faculty of Health Sciences and Technology, College of Medicine, University of Nigeria, Enugu Campus, Enugu, Nigeria, July 25 – 27, 1985).

34. OWOEYE, I. O. Obesity and Physiotherapeutic Approach of Management.
(An Invited Paper presented during a Clinical Symposium organized by the Nigerian Naval Hospital Authority, Navy Town, Lagos, Nigeria, August 9, 1985).

35. OWOEYE, I. O. Team Approach in Health Care Delivery.
(An Invited Paper presented during the 18th Annual Conference/Workshop of the Association of Radiographers of Nigeria, held in Lagos, Nigeria, December 4 – 7, 1985).

36. OWOEYE, I. O. Community Physiotherapy: A Workshop of Nigeria Society of Physiotherapy.
(A Paper presented during a Press Conference held at the Press Centre, Ibadan, Nigeria, January 27, 1986).

37. OWOEYE, I. O. Specific Specialties in Community Physiotherapy: Key issues for the expansion of Physiotherapy Training Curriculum.
(A Paper presented during a Symposium organized by the Nigeria Society of Physiotherapy as the concluding activity of a three – day National Workshop on "Community Physiotherapy" at the University College Hospital, Ibadan, Nigeria, January 28 – 30, 1986.

38. OWOEYE, I. O. The place of splinting and supportive Gadgets in Medical Rehabilitation.
(An Address presented during the opening ceremony of a National Workshop organized by the Nigeria Society of Physiotherapy on "Splinting and Supportive Gadgets in Medical Rehabilitation, held in the Auditorium of the University of Ilorin, Ilorin, Nigeria, April 28, 1986). N. B. This Author was the Chairman of the organizing Committee of this National Workshop.

39. OWOEYE, I. O. Physiotherapy: An Essential Component of Occupational Health in a Technologically Developing Nation.
(A Paper presented during the 1986 Annual Conference and Seminar of the Nigeria Society of Physiotherapy held in Ilorin, Nigeria, April 28 – May 3, 1986).

40. OWOEYE, I. O. The Publication of "Community Physiotherapy: The Proceedings of 1986 January Workshop of Nigeria Society of Physiotherapy.
(An Introductory speech delivered during the launching of the Newly published Book Titled: "Community Physiotherapy", at the Old Great Hall of the College of Medicine, University of Lagos, Lagos, Nigeria, May 29, 1986).

N.B: This Author was the Chairman of the Organizing Committee for the Launching of this new Book.

41. OWOEYE, I. O. Myoelastic Elements: Enhancement of Performance by Electrical Stimulation and Physical Exercise.
(A Paper presented during the First Annual Conference/Seminar of Nigeria Association of Sports Science and Medicine at the University of Ibadan, Ibadan, Nigeria, October 22 – 25, 1986)

42. OWOEYE, I. O. and ADEYEMI DORO, H. O. The Therapeutic Effect of Ultra-Violet Irradiation of Traumatic Open Wounds: An Experimental Investigation.
(A Paper presented during a Workshops/Symposium on "Laboratory Animal in Biomedical Research, Teaching and Training" as part of the Academic Activities for the Silver Jubilee Celebrations of the University of Lagos, held in the Old Great Hall, College of Medicine, University of Lagos, on April 1 – 3, 1987).

43. OWOEYE, I. O. Petroleum Industrial Hazards: Remedial Measures and Facilities available in Physiotherapy.
(A Paper presented during the 1987 Annual Scientific Seminar of the Nigeria Society of Physiotherapy in Port – Harcourt, Nigeria, May 6 – 10, 1987).

44. OWOEYE, I. O. Spinal Manipulations in the Management of Low Back Pain.
(A Presentation in an Interest Group Meeting during the 1987 Annual Scientific Seminar of the Nigeria Society of Physiotherapy in Port-Harcourt, Nigeria, May 6 – 10, 1987).

45. OWOEYE, I. O. Physiotherapy in the Management of Spinal Cord Lesion Resulting in Paraplegia.
(A Paper presented during an Integrated Seminar for Medical Students in the Lecture Theatre of the Institute of Child Health and Primary Health Care, College of Medicine, University of Lagos, Idi-Araba, Lagos, Nigeria on 9$^{th}$ July 1987).

46. OWOEYE, I. O. Systolic and Diastolic Blood Pressures:
Differential Effects due to Physical Fitness and Physical Training.
(A Paper presented during the 1987 Annual Conference of Nigeria Association of Sports Science and Medicine at the University of Ibadan, Ibadan, Nigeria.
October 7 – 9, 1987).

47. OWOEYE, I. O. Maintenance and Management of the Health of the Executives.

(A Keynote Address presented on the Opening Ceremony of a Business Forum of the "Management of Executive Health" organized by the Business Education Examinations Council of Nigeria and held at the Lagos Sheraton Hotel. December 1, 1987).

48. OWOEYE, I. O. Physiotherapy in the Maintenance and Management of Executive Health.
(A Paper presented during a Round-Table Business Forum on the "Management of Executive Health", organized by the Business Education Council of Nigeria and held at the Lagos Sheraton Hotel. December 1-2, 1987).

49. OWOEYE, I. O. Transcutaneous Electrical Nerve Stimulation: Its place in Medical Management and Rehabilitation.
(A Paper presented during the February Departmental Seminar, Department of Physiotherapy, College of Medicine, University of Lagos, Lagos, Nigeria. February 24, 1988).

50. OWOEYE, I. O. Poliomyelitis: Its incidence, Management and Prevention.
(A Paper presented during the Annual Health Week of the University of Lagos Association of Physiotherapy Students (ULAPS), at the College of Medicine, University of Lagos, Lagos, Nigeria. March 30, 1988).

## VI INVITED POSITION PAPERS BY ESTABLISHMENTS OR INSTITUTIONS FOR SOLVING SPECIFIC PROBLEMS.

51. OWOEYE, I. O. Proposals for solving the current unemployment problem of the Nigerian professionals.
(A Paper presented to the Federal Ministry of Employment, Labour and Productivity, Lagos, Nigeria, June 14, 1984).

52. OWOEYE, I. O. Essential Areas of Attention in the Planning to Establish a Department of Medical Rehabilitation
(A paper presented to the Planning Committee for the establishment of a Department of Medical Rehabilitation in the Faculty of Health Sciences and Technology, College of Medicine, University of Nigeria, Enugu, June 19, 1984.
N. B. This Author was appointed as a member of this Planning Committee. The work of this Planning Committee has since been approved by the Authority of the University of Nigeria Nsukka. The New Department of Medical Rehabilitation then being planned has since been established).

53. OWOEYE, I. O. National Health Planning as Relevant to Physiotherapy, Osteopathy and Chiropractic.
(A Paper resented to the Federal National Health Planning Directorate, Federal Ministry of Health, Lagos, February 20, 1984).

54. OWOEYE, I. O. Guidelines for the Practice, Training and Research in Physiotherapy.
(A Paper presented to the National Management Audit Committee, National Health Planning Directorate, Federal Ministry of Health, Lagos, October, 1984).

N. B: On representation of the Nigeria Society of Physiotherapy.

55. OWOEYE, I. O. The list of Minimum Facilities in a Physiotherapy Department of a Teaching Hospital.
(A Paper presented to the National Management Audit Committee, National Health Planning Directorate, Federal Ministry of Health, Lagos October 1984.
N. B: On representation of Nigeria Society of Physiotherapy.

56. OWOEYE, I. O. Formulation of National Policies on comprehensive Medical Rehabilitation in Nigeria.
(A Paper presented to the National Health Advisory Committee, Lagos, October, 1985 on representation of Nigeria Society of Physiotherapy.

N. B: This Author was then a member of this Committee, the National Health Advisory Committee.

57. OWOEYE, I. O.; YESUFU, M. F.; MAKINDE, M. A.; ARIYIBI, G. A. and OBAJIMI, O.
(A Constitution Drafting Committee). The Constitution of the Nigeria Association of Sports Science and Medicine, June 1985. (This drafted Constitution has since been adopted and is now being operated by the Nigeria Association of Sports Science and Medicine).

## VII PAPERS PRESENTED AT SCIENTIFIC CONFERENCES AND WORKSHOPS

58. OWOEYE, I. O. Physiotherapy: An Essential Component of Occupational Health in An Industrially and Technologically Developing Nation.
(A Paper presented during the 1986 Annual Conference and Seminar of Physiotherapy held in Ilorin, Kwara State – April 28 – May 3, 1986).

59. OWOEYE, I. O. Petroleum Industrial Hazards: Remedial Measures and Facilities available in Physiotherapy.
(A Paper presented during the 1987 Annual Scientific Seminar Workshop of the Nigeria Society of Physiotherapy held in Port-Harcourt – May 6 – 10, 1987).

60. OWOEYE, I. O. Community Physiotherapy: Curriculum of Instructomand and Clinical Practice in Primary Health Care System in Nigeria.

(A Paper presented during the 1989 Annual Scientific Conference and Workshop of Nigeria Society of Physiotherapy held in Abeokuta – August 2 – 6, 1989)

61. OWOEYE, I. O. Electrical Stimulus: An inducing factor for Muscular Efficiency rather than Enhancement of Body Weight and Muscle Hypertrophy.
(A Paper presented during the 1989 Annual Conference and Scientific Seminar of Nigeria Association of Sports Science and Medicine held in Ilorin, - October 25 – 28, 1989).

62. OWOEYE, I. O. Prevention and Control of Industrial and Communicable Diseases at Work.
(A Paper presented during the Berger 1990 Health and Safety Week at Berger Paints, Oba Akran Road, Ikeja – April 30 – May 4, 1990).

63. OWOEYE, I. O. The Nigerian Physiotherapy Students of the Present Era.
(An Address presented during the Opening Ceremony of the 9th Annual Scientific Conference of the Nigerian Association of Physiotherapy Students (NAPS) at the College of Medicine, University of Ibadan on June 18, 1990).

64. OWOEYE, I. O. A Reflection of the Past, a Review of the Present, and a Projection into the Future Trend of Development in Physiotherapy.
(A Paper presented during the 9th Annual National Scientific Conference of the Nigerian Association of Physiotherapy Students at the College of Medicine, University of Ibadan, Ibadan on June 18 – 22, 1990).

65. OWOEYE, I. O. Physiotherapy: Personnel, Equipment and Professional Practice in a Depressed Nigerian Economy.
(A Paper presented during the Scientific Session of the 1990 Annual Conference of Nigeria society of Physiotherapy held in Kaduna on August 6 – 11, 1990).

66. OWOEYE, I. O. Clinical Organization.
(A presentation in conducting a Workshop Session during a National Workshop on Physiotherapy Administration, Personnel Management and Medico – Legal issues organized by the Nigeria Society of Physiotherapy in Kaduna on August 6 – 7, 1990)

67. OWOEYE, I. O. Rehabilitation of the Handicapped in a Depressed Economy.
(A Paper presented during the Health Week ’91 of the Nigerian Naval Hospital, Ojo, Lagos on March 4 – 8, 1991).

68. OWOEYE, I. O. A Name, A Quality, A Reputation in Physiotherapy. (An Address presented during the Opening Ceremony of the 10th Annual National Scientific Conference of the Nigerian Association of Physiotherapy Students at the Obafemi Awolowo University, Ile-Ife on April 22, 1991).

69. OWOEYE, I. O. Ethical Value in Patients Care.

(A Paper presented during the 10th Annual National Scientific Conference of the Nigerian Association of Physiotherapy Students at the Obafemi Awolowo University, Ile – Ife on April 22, 1991).

70. OWOEYE, I. O. Medical Social Work in Primary Health Care.
(An Invited Paper presented at the 6th National Conference/Workshop of the Nigerian Association of Medical Social Workers held in Kano on April 25, 1991).

71. OWOEYE, I. O. Electricity: Dangers, Hazards, Prevention and Treatment of the Resulting Injuries.
(A session conducted during the In-Service Training Workshop on "Fabrication and Improvisation of Simple Equipment and Supportive Gadgets in Physiotherapy at the Department of Physiotherapy, Lagos University Teaching Hospital, on May 15, 1991).

72. OWOEYE, I. O. The Frontiers of Physiotherapy.
(A Keynote Address delivered during the Opening Ceremony of the Silver Jubilee Celebration of the Inception of Physiotherapy Training at the University of Ibadan on May 22, 1991)

73. OWOEYE, I. O. and AKINKOYE, B. B: Cardiovascular Responses to Physical Stress.
(A Paper presented during the 11th International Congress of the World Confederation for Physical Therapy held in London (Great Britain) in July, 1991).

74. OWOEYE, I. O.: Leadership Hassle in the Health Sector.
(A Paper presented during the Health Week of the Association of Medical Laboratory Sciences of the Lagos University Teaching Hospital, Idi-Araba on July 27, 1991).

75. OWOEYE, I. O.; DUROSIMI, A. O.; and ADELEKE, M. S.: Road Traffic Accidents: Physiotherapeutic Management of two cases.
(A paper presented during the Scientific Session of 1991 Annual Conference of Nigeria Society of Physiotherapy at the College of Medicine, University of Ibadan, Ibadan on August 17 – 24, 1991).

76. OWOEYE, I. O.: Management including Rehabilitation of the Injured Volleyball Player.
(A Paper presented during a F. I.V.B. Medical Seminar on Traumatology at the University of Lagos Conference Centre on October 15 – 16, 1991).

77. OWOEYE, I. O.: Cardio – Respiratory Responses to Physical Stress. (A Paper presented during the 1991 Annual Conference of Nigeria Association of Sports Science and Medicine at Obafemi Awolowo University, Ile – Ife on October 23 – 26, 1991).

78. OWOEYE, I. O.: Physical Treatment of Acute Pain.
(A Paper presented during a course on Clinical Emergencies for Medical Practitioners organized by the Unilag Consult at the College of Medicine, University of Lagos on March 16 – 28, 1992).

79. OWOEYE, I. O.: Dedication and Sense of Service.
(An Address presented during the Opening Ceremony of the 11th Annual National Scientific Conference of the Nigerian Association of Physiotherapy Students at the University of Lagos, Lagos on April 6, 1992).

80. OWOEYE, I. O.: Managing the Consequences of the Executive Life Style.
(A Paper presented during a Workshop on "Health Problems of Industries in Nigeria", organized by the Unilag Consult at the University of Lagos Conference Centre on April 16, 1992).

81. OWOEYE, I. O.: Prolapsed Uterus: Physiotherapeutic Management
(A Paper presented during the Scientific Session of the 1992 National Scientific Conference of Nigeria Society of Physiotherapy with the theme: "Physiotherapy in Obstetrics and Gynaecology" held in Sokoto on September 3 – 6, 1992).

82. OWOEYE, I. O.: Voltaren Emulgel: A Non-Steroidal Anti-inflammatory Drug in the Management of Acute Painful Conditions.
(A Paper presented during the Scientific Session of Benue '93, the 1993 Annual Scientific Conference of Nigeria Society of Physiotherapy held in Makurdi, Benue State on July 27 – 30, 1993).

83. OWOEYE, I. O.: Samadhi Tank: A Floatcell for Enhancement of Learning and Management of Stress and some Painful Conditions.
(A Paper presented during the Scientific Session of Benue '93, the 1993 Annual Scientific Conference of Nigeria Society of Physiotherapy held in Makurdi, Benue State on July 27 – 30, 1993).

84. OWOEYE, I. O.: Physiotherapy Practice in Nigeria: Problems and Prospects.
(A Guest Lecture at the Official Inauguration of the Nigeria Society of Physiotherapy, Osun State Branch held at the Presidential Hotel, Osogbo, Osun State on Thursday, December 29, 1994).

85. OWOEYE, I. O.: Ethical Value in Patients Care.
(A Guest Lecture delivered during the Workshop for the Heads of Departments of Physiotherapy and Training Schools of Physiotherapy in Nigeria on the theme: "ETHICAL VALUE IN PATIENTS CARE" held at the University of Benin Teaching Hospital, Benin City on March 31, 1995).

86. OWOEYE, I. O.: The Evolving Dimensions of Excellence Physiotherapy.

(A Paper presented during the Scientific Session of the World Confederation for Physical Therapy – 1995 WCPT Congress held in Washington D. C., U. S. A. on June 26, 1995).

87. OWOEYE, I. O.: The Trend of Physiotherapy Research in the Advances of Sports Science and Medicine.
(A Paper presented during the 1995 Annual Conference of Nigeria Association of Sports Science and Medicine held at the Faculty of Education, University of Ibadan, Ibadan, Nigeria, from November 30, 1995 to December 2, 1995).

88. OWOEYE, I. O.: Sex Difference in Electromyography Activity of the Lower Trunk Muscles.
(A Paper presented during the 1997 Annual Conference of Nigeria Association of Sports, Sciences and Medicine held at the National Institute of Sports, Lagos, Nigeria, November 28, 1997).

89. OWOEYE, I. O.: The Role of Physiotherapy in the next Millennium.
(A Paper presented during the 1998 Physiotherapy Week of the Ogun State Chapter of the Nigeria Society of Physiotherapy, held at the O. G. B. C. Conference Hall, Ibara, Abeokuta, Nigeria on March 5, 1998).

90. OWOEYE, I. O.: Restricted Environmental Stimulation Therapy.
(A Paper presented during the Scientific Session of the 13th International Congress of the World Confederation for Physical Therapy, held at the National Convention Hall, Yokohama, Japan, May 23 – 28, 1999).

91. OWOEYE, I. O.: The Role of Physiotherapy in the next Millennium.
(A Paper presented during the Scientific Session of the 13th International Congress of the World Confederation for Physical Therapy, held at the National Convention Hall, Yokohama, Japan, May 23 – 28, 1999).

92. OWOEYE, I. O.: The Role of Physiotherapy in Enhancement of Excellence in the Third Millennium.
(A Paper presented during the Scientific Session of the 4th World Confederation of Physical Therapy – Africa Congress at Sheraton Kampala Hotel, Uganda, August 6 – 12, 2001).

## PUBLISHED RESEARCH WORKS OF THIS AUTHOR

## (i.e. PROFESSOR ISAAC O. OWOEYE)

Most of these research reports were presented in national and international scientific conferences. Nationally i.e. in Nigeria and internationally i.e. in the United States of America, Australia, United Kingdom, Japan and Uganda.

The Books and Monographs were published as Nos. 1 – 13 while the Scientific Papers (Nos. 14 – 73) were published in National and International Journals as indicated below:

## I. Published Books and Monographs

1. OWOEYE, I. O. (1985): The Oath of Physiotherapy Practice. Lagos: Nigeria Society of Physiotherapy, 1985 (4 pp).
   (N. B. This is a Monograph. This researcher is the author of the only Oath of Physiotherapy Practice in the length and breadth of the world. This was composed first in 1983 but had to go through several processing until final approval by the Governing Council of Nigeria Society of Physiotherapy for use and subsequent publication as a Monograph in 1985. This Monograph is now an instrument of the Council for Physiotherapy in Nigeria. The Oath is administered on all fresh graduates in Physiotherapy). This same Oath has been revised by this same author for the use of the Medical Rehabilitation Therapists Board of Nigeria.

2. OWOEYE, I. O. (1985): The ceremony of formal Admission to Membership of the Nigeria Society of Physiotherapy. Lagos: Nigeria Society of Physiotherapy, 1985 (7pp.)
   (N. B. This is a Monograph. As early as 1983 this Researcher wrote this Monograph for formal admission of new members which after the usual review and processing was approved by the Council. It was published in 1985. It is the first of its type in the world. Several other countries have since emulated the Nigerian composition. It is today an instrument of the Governing Council for the National Professional Body of Physiotherapy in Nigeria).

3. OWOEYE, I. O. (Ed.) (1986): Nigeria Society of Physiotherapy at 25. Apapa: NAS PRESS, 1985 (72pp).
(N. B. This is a Handbook of Nigeria Society of Physiotherapy, edited by this researcher. This Handbook serves the user more as a reference book and a source of vital information on all aspects of Physiotherapy as available from 1959 up to 1985).

4. OWOEYE, I. O.; SANYA, A. O. and AIGBOGUN, O. S. (Eds.) (1986): Community Physiotherapy. IBADAN: The Sketch Publishing Company Ltd. 1986 (128pp).
(N.B. This is a Reference and Text Book on Community Physiotherapy. Up to date this is the only textbook available in Community Physiotherapy. This book has a worldwide distribution. A couple of years back an organ of the Government of India requested for two copies of this book to serve as Reference text to develop their national policy Community Physiotherapy. Copies of this book are available in all the libraries in Nigeria).

5. OWOEYE, I. O. (Ed.) (1990): The Oath of Physiotherapy Practice and Oaths of Offices, Second Edition. Lagos: Nigeria Society of Physiotherapy, 1990, (8pp.)
(N. B: This is a Monograph, the second edition of the earlier cited one. This has since been an official document of the Council of Physiotherapy in Nigeria. The Monograph is constantly in use).

6. OWOEYE, I. O. (Ed.) (1990): The Ceremony of Formal Admission to Membership of Nigeria Society of Physiotherapy, 1990 (8pp).
(N. B: This is Monograph, a second edition of the first one. This Monograph is constantly in use by the Governing Council of the National Professional Body of Physiotherapy in Nigeria).

7. OWOEYE, I. O. (Ed.) (1995): The Nigeria Medical Rehabilitation Therapists Bulletin, Vol. 1 (No. 1), August, 1995.
(N. B: This is an official Bulletin of the Medical Rehabilitation Therapists Board of Nigeria (MRTB). This Board is a Parastatal, an arm of the Federal Ministry of Health in Nigeria. This Board controls the training and practice of the following five medical disciplines: Physiotherapy, Osteopath, Chiropract, Occupational Therapy and Speech Therapy and Clinical Audiology in Nigeria).
The maiden edition of the Nigeria Medical Rehabilitation Therapists Bulletin, i.e. Vol., 1, No. 1 of August 1995 published the 1995 Registers (Five Registers) of this Board (MRTB) for the above five medical disciplines. This Bulletin is an annual publication of the Medical Rehabilitation Therapists Board of Nigeria.

8. OWOEYE, I. O. (Ed.) (1996): The Nigeria Medical Rehabilitation Therapists Bulletin, Vol. 1 (No. 2), August, 1996.
(N. B.: This is an official Bulletin of the Medical Rehabilitation Therapists Board of Nigeria (MRTB). This Board is a Parastatal, an arm of the Federal Ministry of Health in Nigeria. This Board controls the training and practice of the following five medical disciplines: Physiotherapy, Osteopath, Chiropract, Occupational Therapy and Speech. Therapy and Clinical Audiology in Nigeria).

9. OWOEYE, I. O. (Ed.) (1997): The Nigeria Medical Rehabilitation Therapists Bulletin, Vol., 2 (No.3), August, 1997.
(N.B: This is an official Bulletin of the Medical Rehabilitation Therapists Board of Nigeria (MRTB). This Board is a Parastatal, an arm of the Federal Ministry of Health in Nigeria. This Board controls the training and practice of the following five medical disciplines: Physiotherapy, Osteopath, Chiropract, Occupational therapy and Speech Therapy and Clinical Audiology in Nigeria).

10. OWOEYE, I. O. (Ed.) 1998: The Nigerian Medical Rehabilitation Therapists Bulletin, Vol. 3 (No. 4), August, 1998.
(N.B: This is an official Bulletin of the Medical Rehabilitation Therapists Board of Nigeria (MRTB). This Board is a Parastatal, an arm of the Federal Ministry of Health in Nigeria. This Board controls the training and practice of the following five medical disciplines: Physiotherapy, Osteopath, Chiropract, Occupational Therapy and Speech Therapy and Clinical Audiology in Nigeria).

11. OWOEYE, I. O. (Ed.) 1999: The Nigeria Medical Rehabilitation Therapists Bulletin, Vol. 3 (No. 5), August, 1999.
(N.B: This is an official Bulletin of the Medical Rehabilitation Therapists Board of Nigeria (MRTB). This Board is a Parastatal, an arm of the Federal Ministry of Health in Nigeria. This Board controls the training and practice of the following five medical disciplines: Physiotherapy, Osteopath, Chiropract, Occupational Therapy and Speech Therapy and Clinical Audiology in Nigeria).

12. OWOEYE, I. O. (Ed.) 2000: The Nigeria Medical Rehabilitation Therapists Bulletin, Vol. 4 (No. 6), August, 2000.
(N.B: This is an official Bulletin of the Medical Rehabilitation. Therapists Board of Nigeria (MRTB). This Board is a Parastatal, an arm of the Federal Ministry of Health in Nigeria. This Board controls the training and practice of the following five medical disciplines: Physiotherapy, Osteopath, Chiropract, Occupational Therapy and Speech Therapy and Clinical Audiology in Nigeria).

13. OWOEYE, I. O. (Ed.) 2001: The Nigeria Medical Rehabilitation therapists Bulletin, Vol. 4 (No. 7) August, 2001. (ISSN: 1118 – 1397).

(N.B: This is an official Bulletin of the Medical Rehabilitation Therapists Board of Nigeria (MRTB). This Board is a Parastatal, an arm of the Federal Ministry of Health in Nigeria. This Board controls the training and practice of the following five medical disciplines: Physiotherapy, Osteopath, Chiropract, Occupational Therapy and Speech Therapy and Clinical Audiology in Nigeria).

N.B: Copies of these books and Monographs are widely distributed either for literary references or as samples for other professional bodies in other countries.

The National Library of Nigeria has copies of all these books and Monographs.

**II. Published Research Works.**

14. OWOEYE, I. O. (1983): Thermal Sensation: The Basis for the Skin Sensation Test in Electrotherapy and Thermal Therapy.
Journal of the Nigeria Society of Physiotherapy (ISSN: 0331 – 3735), VIII (3), 25 – 29.
(N.B: Before this time, skin sensation test to heat changes using hot and cold water was carried out in heat treatment in Physiotherapy without any Scientific basis. For the first time, this study established the scientific basis of skin sensation test as well as identified the best technique for this test. This published work has since been a reference paper for physiotherapists the world over).

15. OWOEYE, I. O. (1983): Further Expanded Roles of Physiotherapy in the Basic Primary Health Care for the Nigeria Community.
ABUH PHYSIO Journal (ISSN: 0331 – 9113), 6(3 & 4), 86 – 93.
(N. B: Several years before the Primary Health Care became a priority in the National Health Policy of Nigeria, this researcher

produced this published paper. T he in-puts of this paper are today the points of focus in Primary Health Care Programmer in Nigeria).

16. OWOEYE, I. O. (1984): Low Back Pain: Indications and Contra-Indications for manipulations.
ABUH PHYSIO Journal (ISSN 0331 – 9113), 7 (3), 50 - 68.
(N. B.: In clinical experience in Manipulative therapy, this study identified the indications and contra-indications for the procedure of Manipulations in the management of Low Back pain).

17. RAJI, M. R.; OWOEYE, I. O. (1984); Burns: The pattern of Incidence and Physical Management at the Lagos University Teaching Hospital, Lagos.
ABUH PHYSIO Journal (ISSN: 0331 – 9113), ( 1 & 2), 1 – 19).
(N.B: This study was carried out at a time when there were several cases of burns brought to this Teaching Hospital. This study successfully identified the causes of the burns; the study educated the public on preventive measures; and appropriate Physiotherapeutic measures were identified to effect management that prevented the usual complications of contractors that notoriously characterized the earlier cases managed in this Hospital).

18. OWOEYE, I. O. (1984): Low Back Pain: A Multi-Directional Physical Therapy Approach. ABUH PHYSIO Journal, (ISSN: 0331 – 9113, 7 ( 1 & 2), 26 – 47.
(N. B.: This study was carried out at Kingsbrook Jewish Medical Centre, in New York, U. S. A. For the first time, some combinations of some varieties of Physiotherapeutic modalities were employed in physical management of Low Back Pain. The results indicated that the use of combination of such modalities proved more effective than the earlier method of using single modality procedures).

19. OWOEYE, I. O. (1984): The Extent of Stretch: A Test of Healing Quality following Electrical Treatment of Traumatized Tendon.
Journal of Nigeria Society of Physiotherapy. (ISSN: 0331 – 3735), IX (1), 30 – 32).
(N. B.: This study was carried out at the Institute of Rehabilitation Medicine of the New York University Medical Centre, New York, U. S. A. In Physiotherapy one of the problems in research studies was instrument for measurement. This was the first time in a study on healing that an objective measurement was made using a strain gauge. By physical means this measurement determined the quality of healing).

20. OWOEYE, I. O. (1985): The Gross Body Weight, following the Treatment of Traumatically Ruptured Tendon by Electrical Stimulation
ABUH PHYSIO Journal, (ISSN: 0331 – 9113), 8 (1 & 2), 12 – 25.
(N.B: This work was done at the Institute of Rehabilitation Medicine of the New York University Medical Centre New York City, U. S. A.
In Physiotherapy, Electrical Stimulation is extensively used for diversified traumatic and pathological conditions. This research study happened to be the first study in which the effect of two types of electrical currents was investigated on the body weight. The results obtained were compare to that of a control group. The results were very exciting because the current electricity that had been more extensively used by Physiotherapists was found to have deteriorating effect on the body weight).

21. OWOEYE, I. O. (1985): Sex Differences in Electromyography Activity of the Lower Trunk Muscles.
ABUH PHYSIO Journal (ISSN: 0331 – 9113), 8 (1 & 2), 1 – 11.

(N. B.: This research study was carried out at the Institute of Rehabilitation Medicine of the New York University Medical Centre, New York, U. S. A.

Earlier than this study, electromyography studies of the human muscles had been done and reported in Medical Literature. This study, however, was the first study to scientifically analyze the effect of sex on the muscle activities of the lower trunk. By the results of this study, the therapist now knows how much work load is expected from the muscles of both sexes).

22. OWOEYE, I. O. (1985): Weight Control.

The Sailor: Quarterly Journal of the Nigerian Navy (ISSN: 0189 – 9376), No. 3, 22 – 23, 28 – 29.

(N. B.: This research paper was presented in a Scientific Symposium organized by the Nigerian Navy at a time when obesity was identified as a problem encountered by the naval men. Because of its worth and its problem – solving nature, the paper was published by the Nigerian Navy).

23. OWOEYE, I. O. (1985): What is Physiotherapy?

In Owoeye (Ed.): Nigeria Society of Physiotherapy at 25, Lagos: NAS Press, 1985, 5-7.

(N.B.: This publication educates both the members of the public and the medical (including physiotherapy) practitioners on what the modern physiotherapy is).

24. OWOEYE, I. O. (1986): Specific Specialties in Community Physiotherapy. In Owoeye, *et al*. (Eds.): Community Physiotherapy. IBADAN: Sketch Press 1986, 112- 116.

(N. B: This researcher, in this publications identified a new course of studies in Physiotherapy. He also identified the various components of

this new course of study. It's the first time a paper like this was ever published.

25. OWOEYE, I. O. (1987): The Role of Medical Rehabilitation in Nigeria's Health Delivery
In Umerah, *et al.* (Eds.): Nigeria's Health Care Delivery. Enugu: Faculty of Health Science and Technology, College of Medicine, University of Nigeria, 1987, 109 – 13.
(N. B: In this publication, the researcher identified the various disciplines and specific procedures for effective Medical Rehabilitation. Also identified are the beneficiaries of the procedure of Medical Rehabilitation. This paper is unique in the sense that it identified national problems in Medical Rehabilitation and proffered means of solving such problems).

26. OWOEYE, I. O. ; SPIELHOLZ, N. I.; FETTO, J. and NELSON, A. J. (1987): Low intensity Pulsed Galvanic Current and the Healing of Tantalized Rat Achilles Tendons: Preliminary Report using Load – to – Breaking Measurements.
Arch. Phys. Med. Rehabil, 68 – 415 – 418.
(N. B.: This elaborate research study was carried out at the Institute of Rehabilitation Medicine of the New York University Medical Centre.
In the history of Physiotherapy, this was the first time that Physiotherapists (the researchers here) undertook the invasive method and using implanted electrodes to investigate the effectiveness of some electrical currents on collagenous regeneration in traumatic injury to tendons.
The results of this study reported in one of the most reputable international Journals was a break through in the world of scientific investigations. A particular current electricity was identified as capable of accelerating healing faster than the other currents.

27. NELSON, A. J.; OWOEYE, I. O.; SPIELHOLZ, N. L. and FETTO, J. (1987): Uses of Pulsed Electrical Stimulation for Tendon Healing.
In Hunter, *et al* (Eds.): Tendon Surgery in the Hand, Washington, D. C.: The C. V. Mosby Company (1987), 109- 111.
(N. B.: This research study was done at the Institute of Rehabilitation Medicine of New York University Medical Centre, New York, U. S. A.
This work being a pioneer one on stimulation of tendon healing using pulsed electrical current was published as a Chapter in a voluminous textbook of Surgery. This study on the basis of its unique scientific design has since been a springboard from which several other studies have taken off).

28. OWOEYE, I. O. (1987): Myoelastic Element: Enhancement of Performance by Electrical Stimulation and Physical Exercise.
Journal of Nigeria Association of Sports Science and Medicine (JONASSM), ISSN 0794 – 7682, Vol. 1 (No. 1), 30 – 44.
(N. B.: The work of this research study was done at the College of Medicine of the University of Lagos and the Lagos University Teaching Hospital. Idi-Araba, Lagos, Nigeria.
While for lack of equipment, Physiotherapists in this country often rely only on physical exercise to treat patients for weakness of muscles, physiotherapists in several other advanced countries rely only on electrical stimulation. The results of this study have objectively established that the myoelastic elements of muscles are best activated by the combined utilization of faradic current electricity and physical exercise. Both patients and training sportsmen and women have been benefiting from the findings of this study).

29. OWOEYE, I. O. (1988): Systolic and Diastolic Blood Pressure: Differential Effects due to Physical Fitness and Physical Training.
Journal of Nigeria Association of Sports Science and Medicine (JONASSM: ISSN 0794 – 7682), Vol. II (No. 1). 39 – 51.
(N. B.: This research study has scientifically demonstrated how systolic and diastolic blood pressures can be predicated by the level of the physical fitness of the individual. How physical training can affect these variables and protect the individual has further been established. The patient and the potential athlete have a lot benefit from the results of this study).

30. OWOEYE, I. O. (1988 – 1989): A reflection of the past, a review of the present, and a projection into the future trend of development in Physiotherapy.
Jamaica Physiotherapy Association Journal, 1988 – 1989, 18 – 25.
(N. B.: This publication is unique in the sense that this researcher used the anvil of the past and present in a scientific manner to predict and identify the future trends of development in Physiotherapy. This Paper has attracted a worldwide attention in various circles of physiotherapy and physical Medicine).

31. OWOEYE, I. O. (1990): A reflection of the past, a review of the present and a projection into the future trend of development in Physiotherapy.
Journal of Pakistan Physiotherapy Society Vol. 4 & 5 (1), 3 – 13.
(N. B.: Due to the Scientific innovations generated by this paper there has been popular demand for reprints from several parts of the world. The Editorial Board of this Journal particularly wrote for the permission of this research to allow the paper to be re-published in their Journal as there are several readers from that part of the world).

32. OWOEYE, I. O. (1990): The Gross Body Weight following the Treatment of Traumatically Ruptured Tendon by Electrical Stimulation.
Journal of the Nigeria Society of Physiotherapy (ISSN: 0331 – 3735), Vol. X (1), 10 – 14.
(N. B.: This work was done at the Institute of Rehabilitation Medicine of the New York University Medical Centre, New York City, U. S.A.
In Physiotherapy, Electrical Stimulation is extensively used for diversified traumatic and pathological conditions. This research study happened to be the first study in which the effect to two types of electrical currents was investigated on the body weight. The results obtained were compared to that of a control group. The results were very exciting because the current electricity that had been more extensively used by Physiotherapists was found to have a deteriorating effect on the body weight).

33. OWOEYE, I. O. (1990): Community Physiotherapy: Curriculum of Instruction and Clinical Practice in Primary Health Care System in Nigeria.
Journal of the Nigeria Society of Physiotherapy. (ISSN: 0331 – 3735), Vol. IX (2), 36 – 40.
(N. B.: This Researcher is the author of this unique Curriculum of Instruction in Community Physiotherapy. All other universities in Nigeria offering courses of instruction in Physiotherapy have used this published work for inclusion in their curricula of instruction).

34. OWOEYE, I. O. (1990): Electrical Stimulus: An inducing factor for Muscular Efficiency rather than enhancement of Body Weight and Muscle Hypertrophy. In AMUSA and AGBONJIMI (Eds.): Application of Sports Science and Medicine to Soccer. IBADAN:

The Nigeria Association of Sports Science and Medicine, 1990, 219 – 230.

(N. B.: This research study successfully established the effectiveness of a physiotherapeutic procedure, that is electrical stimulation for the enhancement of muscular strength and efficiency).

35. OWOEYE, I. O. (1991): To observe the Inherent – Health Hazards of the Petroleum and Petrochemical Industry: the facilities available in Physiotherapy for Preventive, Curative and Rehabilitative Measures, Journal of Pakistan Physiotherapy Society, Vol. VII (1), 3 – 12.

(N. B.: As at the present moment, the largest source of income for several countries the world over are Petroleum and Petrochemical Industries. This researcher is the first Physiotherapist in the world who has looked into the Hazards of these industries. In this study, he has successfully discussed the remedies of these health hazards and identified physiotherapeutic facilities for preventive, curative and rehabilitative measures).

36. OWOEYE, I. O. and AKINKOYE, B. B. (1991): Cardiovascular responses to Physical Stress. World Confederation for Physical Therapy (W. C. P. T.) International Congress Book III, 1355 – 1357.

(N. B.: For the first time, this elaborate research study evaluated the cardiovascular responses of people of different occupations to standardized physical stress. The effect of Physical training on these variables was also investigated. This paper was presented in London in July, 1991 during the 11$^{th}$ International Congress of the World Confederation for Physical Therapy. In recognition of the valuable contribution to knowledge by this study, the paper has been published in a book by the Highest World Body in Physiotherapy, i. e. W. C. P. T.).

37. OWOEYE, I. O. (1991): Physiotherapy: Personnel, Equipment and Professional Practice in a Depressed Nigerian Economy.
Journal of the Nigeria Society of Physiotherapy (ISSN: 0331 – 3735), Vol. X, No. 2). 20 –22.
(N. B.: For the first time, Scientific Investigation on how the national economy affects the practice of physiotherapy in Nigeria was carried out).

38. OWOEYE, I. O.; DUROSIMI, A. O. and ADELEKE, M. S. (1992): Road Traffic Accidents: Physiotherapeutic Management of Two Cases.
Journal of the Nigeria Society of Physiotherapy (ISSN: 0331 – 3735). Vol. XI (No. 1), 16 – 21.
(N. B.: In this study, effective physiotherapeutic procedures were identified for management of road traffic accident cases. The dangers and consequences of road traffic accidents were highlighted while preventive measures were proffered).

39. OWOEYE, I. O. (1992): Manipulations, Adhesive Plaster Strapping, Dennings Browne's Splinting and Plaster of Paris Casting in the Physical Management of Idiopathic Congenital Talipes Equinovarus can be successfully managed by physical procedures in the hands of physiotherapists.

40. UKAEGBU, A. O. and OWOEYE, I. O. (1992): The Management of Shoulder Pain of Musculoskeletal origin using Feldene Gel (Piroxicam).
Journal of the Nigeria Society of Physiotherapy (ISSN: 0331 – 3735): Vol. XI (No. 2), 28 – 31.
(N. B.: This study being the first clinical trial study carried out on the new product, Piroxicam, in Nigeria it identified the most effective

means of application resulting in symptomatic relief of shoulder pains of musculo-skeletal origin.

41. OWOEYE, I. O. (1992): Cardio respiratory Response of Adults in Different Occupations to Physical Stress.
Journal of Nigeria Association of Sports Science and Medicine, (JONASSM: ISSN: 0794 – 7682), Vol, IV, 8 – 20.
(N.B: This study successfully established the cardio-respiratory fitness of people of different occupations and the need for the physically inactive individuals to engage in some form of regulated physical training).

42. OWOEYE, I. O. (1993): Prolapsed Uterus: Physiotherapeutic Management.
Journal of the Nigeria Society of Physiotherapy (ISSN: 0331 – 3735), Vol. XII, No. 1, 22 – 27.
(N.B: This study objectively established the effectiveness of Physiotherapy in an abnormal condition in Obstetrics and Gynaecology i.e. of prolapsed uterus).

43. OWOEYE, I. O.; AJAYI, G.O and LAWAL, T.A. (1993): The incidence of Low Back Pain and their management in the Third Trimester of Pregnancy and after Delivery.
Journal of the Nigeria Society of Physiotherapy (ISSN: 0331 – 3735), Vol. XII, (No. 1), 36-43.
(N.B: Pregnancy being a normal biological process is often accompanied by low back pain (during its Third Trimester). This study successfully identified the safe and effective physical therapeutic procedures for the management of low back pain during pregnancy).

44. OWOEYE, I. O. (1993): Voltarene Emulgel: A non-Steroidal Anti-Inflammatory Drug in the management of Acute Painful Conditions. Journal of Nigeria Association of Sports Science and Medicine (JONASSM: ISSN: 0794 – 7682), Vol. V, 8-19.

45. OWOEYE, I. O. (1994): Voltarene Emulgel: A non-Steroidal Anti-Inflammatory Drug in the management of Acute Painful Conditions. Journal of the Nigeria Society of Physiotherapy, (ISSN: 0331 – 3735), Vol. XII, (No. 2), 25 – 36.
(N.B: On the production of this drug by Ciba Geigy through the Swiss – Nigerian Chemical Industry, this Researcher was invited to carry out the First Clinical Trial Tests to determine the Therapeutic Effects of the drug. Besides this objective, this researcher went all out to investigate the complications and side effects of this drug.

The findings of this study have brought a great relief to patients of acute painful conditions of musculo-skeletal origin. Following the finding of this investigation as reported in this paper, the management of the Lagos University Teaching Hospital has stocked this drug for therapeutic application in various clinics of the Hospital.

This study validated the efficacy of this drug in the procedures of Physiotherapy in the management of Acute Painful Conditions of Musculoskeletal Origin. The findings of this study officially presented before the Pharmacy Committee as at the time of its introduction into the Nigerian market led to its placement on the Essential Drug list of the Federal Ministry of Health in Nigeria).

46. OWOEYE, I. O. (1994): SAMADHI TANK: A Floatcell for Enhancement of Learning and Management of Stress and some Painful Conditions.

Journal of the Nigeria Society of Physiotherapy, (ISSN: 0331 – 3735), Vol. XII (No, 2), 46-59.

(N.B: This is a pioneer study on this newly imported health technology, the first of its type, imported by the Float cells Limited of Nigeria into Nigeria and of course the first of its type in the whole of Africa. Beside the variables of investigation the safety of this complex, sophisticated and computerized equipment. the possibility of its abuse was also a subject investigated by this researcher.

The findings reported in this paper are of great benefit to mankind. Indeed the findings as reported in this paper constitute a break-through in Modern Medicine).

47. OWOEYE, I. O. (1994): The Effect of Flotation on intellectual Learning.
Journal of Nigeria Association of Sports Science and Medicine, (ISSN: 0794 – 7682), Vol. IV (1994), 7-11.

(N.B: With the use of Samadhi Tank, a product of Modern Technology, this researcher, in this pioneer study, discovered a Scientific Method of Enhancement of Intellectual Learning, an advantage to students, world-wide).

48. OWOEYE, I. O. AND ADEYEMI-DORO, H.O (1995): The Therapeutic Effect of Ultra-Violet Irradiation of Traumatic Open Wounds: An Experimental Investigation.
Journal of the Nigeria Society of Physiotherapy. (ISSN: 0331-3775), Vol. XIII, No. 1, January, 1995, 33-44.

(N.B: In recent time, in Nigeria and the rest of the world, the cost of wound cares has become very exorbitant to the patients. These researchers, in this experimental investigation, have identified a very reliable physiotherapeutic procedure that can accelerate wound healing and hence cut down on hospital bills).

49. OWOEYE, I. O. (1995): Manipulative Therapy in the Management of Back Pain: Indications and Contra-indications.
Journal of the Nigeria Society of Physiotherapy. (ISSN: 0331-3735), Vol. XIII, No. 1, January, 1995, 12-17
(N.B: An effective Physical Procedure in the management of back pains is manipulate Therapy. Some Physical Therapists thus subject all cases of back pains in their hands to manipulations. In this study, this researcher found that all cases of back of pains do not benefit from manipulations. For the first time, this researcher objectively identified indications and contra-indications to manipulations in the management of back pains).

50. OWOEYE, I.O (1996): Sex Differences in Electromyographic Activity of the Lower Trunk Muscles.
Journal of the Nigeria Medical Rehabilitation Therapists, (ISSN: 118-3489), Vol (No. 1), June 1996, 21-24.
(N.B: This research study was carried out at the institute of Rehabilitation Medicine of the New York University Medical Centre, New York U.S.A.

Earlier than this study, electromyographic studies of the human muscles had been done and reported in Medical Literature. This study, however, was the first study to scientifically analyze the effect of sex on the muscle activities of the lower trunk. By the results of this study, the therapist now knows how much workload is expected from the muscles of both sexes.

51. EGWU, M. O.; NWUGA, V. C. V. and OWOEYE, I. O. (1996):
Prevalence of undiagnosed Hypertension among Apparently Health Nigerians.
Journal of the Nigeria Medical Rehabilitation Therapists, (ISSN: 1118 – 3489), Vol. 1, (No. 1), June 1996, 29 – 31.

(N.B.: This investigation objectively proved that seemingly healthy Nigerians may have undetected medical problems. Hence periodic medical check-ups for apparently healthy Nigerians become essential).

52. AKINBO, S. R. A. and OWOEYE, I. O. (1996): Cryotherapy and Elastic Bandaging in the Management of Sprained Ankle.
Journal of the Nigeria Medical Rehabilitation Therapists,
(ISSN: 1118 – 3489), Vol. 1., (No. 1), June 1996, 29 – 31.
(N.B.: The effectiveness of Cryotherapy has been demonstrated very objectively in the management of Traumatic Ankle Injuries in this Studies. The First Therapeutic Approach in the management of Traumatic Injuries such as Sprained Ankle is therefore Cryotherapy).

53. OWOEYE, I. O. (1996): What is Physiotherapy?
Journal of the Nigeria Medical Rehabilitation Therapists, (JNMRT ISSN: 1118 – 3489), Vol. 1 (No. 1), June 1996, 7 – 8).
(N.B.: This publication educates both the members of the public and the medical (including physiotherapy) practitioners on what the modern physiotherapy is).

54. OWOEYE, I. O. (1996): The Role of Medical Rehabilitation in Nigeria's Health Care Delivery.
Journal of the Nigeria Medical Rehabilitation Therapists
(ISSN: 1118 – 3489) Vol. 1 (No. 2). December, 1996, 6 – 15.
(N. B.: In this publication, the researcher identified the various disciplines and specific procedures for effective Medical Rehabilitation. Also identified are the beneficiaries of the procedures of Medical Rehabilitation. This paper is unique in the senses that it identified national problems in Medical Rehabilitation and proffered means of solving such problems).

56. OWOEYE, I. O. (1997): Medical Rehabilitation of the Therapists Disabled Children in Nigeria.
Journal of the Nigeria Medical Rehabilitation Therapists
(ISSN: 1118 – 3489) Vol. 2 (No. 3), June, 1997 , 6 – 11.
(N. B.:. This is a position paper. This researcher enumerated the major crippling and physically disabling diseases of childhood. Some other traumatic injuries of childhood were also identified. The roles of team approach in comprehensive medical rehabilitation were described while preventive measures including national policies on eradication of the diseases were proffered).

57. OWOEYE, I. O. (1997): Thermal Sensation, the Bases for the Skin Sensation Test in Electrotherapy and Thermal Therapy.
Journal of the Nigeria Medical Rehabilitation Therapists
(ISSN: 1118 – 3489) Vol. 2 (No. 3), June, 1997 , 34 – 40.
(N. B.: Before this time, skin sensation test to heat changes using hot and cold water was carried out in heat treatment in Physiotherapy without any Scientific basis. For the fist time, this study established the scientific basis of skin sensation test as well as identified the best technique for this test. This published work has since been a reference paper for physiotherapists the world over).

58. OWOEYE, I. O. (1997): Clinical Trials on Stericon Plaster of Paris Bandages.
Journal of the Nigeria Medical Rehabilitation Therapists
(ISSN: 1118 – 3489) Vol. 2 (No. 3), June, 1997, 56.
(N. B.: Stericon Plaster of Paris Bandages were recently imported into the country by a Pharmaceutical Firm. In this Study i.e. Clinical trials, the potency of this material in the tropics was determined. On the basis of this research findings, the manufactures were advised on the modification of the products to be used within the tropics. Through this study, the

distributors and the users (i.e. the therapists) were advised on handling and usage of Stericon Plaster of Paris Bandages).

59. OWOEYE, I. O. (1997): The Trend of Physiotherapy Research in the Advances of Sports Science and Medicine.
In: IGBANUGO, V. C. (Ed.) (1995): Research in Health, Physical Education and Dance.
IBADAN: Stirling – Horden Publishers (Nig.) Ltd., University of Ibadan, Ibadan, Nigeria 1 - 5
(N.B.: In this paper the current Physiotherapeutic Management of Sports Injuries and the Rehabilitation of the severely injured ones were reviewed. In proffering the trend of physiotherapy research in the Advances of Sports Science and Medicine emphasis has been placed on further collaborative and interdisciplinary studies. The effects of electrical stimulation and other physiotherapeutic procedures on young sports talents were identified).

60. OWOEYE, I. O. and IKHALEA, M. I. (1997): Physical Assessment following Physiotherapy in the Management of Lumbago.
Journal of the Nigeria Medical Rehabilitation Therapists.
(ISSN: 1118 – 3489), Vol. 2. (No. 4), 36 – 38.
(N. B.: The most intriguing aspect of physiotherapy in the management of Lumbago has always been the physical assessments of the therapeutic response of the patients. In the scientific investigations reported in this paper, measurement of spiral mobility has successfully been proved to be an objective and reliable method of physical assessment following physiotherapy in the management of lumbago).

61. AKINBO, S. R. A. and OWOEYE, I. O. (1998): Characterization of the Effects of Denervation on Bone Development: And Experimental Study on Spargne- Dowly Rats.

Journal of the Nigeria Medical Rehabilitation Therapists
(ISSN: 1118 – 3489), Vol. 3, (No. 5), 49 – 52.
(N. B.: What makes up the known characteristic appearances of the animal bodies including man is the integrity of the muscles. The researchers into his study have scientifically discovered that the integrity of the muscles via their activities as induced by the quality of their innervations can determine the proper or improper development of the bones to which the muscles are attached or from which the muscles originates.

62. OWOEYE, I. O. (1998): Interdisciplinary Team Approach in Health Care Delivery.
Journal of the Nigeria Medical Rehabilitation Therapists
(ISSN: 1118 – 3489), Vol. 3 (No. 5), 13- 15.
(N.B.: In this paper, this author identified an interdisciplinary team approach as a very reliable means of accomplishing comprehensive health care. The entailed professional and scientific benefits were identified. Further, this author identified this approach (i.e. Interdisciplinary Team Approach) as a suitable forum for sharing professional responsibilities, particularly in making very difficult ethical decisions).

63. OWOEYE, I. O. (1997): The Trend of Physiotherapy Research in the Advances of Sports Science and Medicine. In IGBANUGO V. C. (Ed.): Research in Health, Physical Education, Sport and Dance. IBADAN: Stirling Horden Publishers Nig. Ltd. 1997, 1- 5.
(N. B.: In this paper, the trend of Physiotherapy Research in the advances of Sports Science and Medicines is outlined. The inherent problems were identified while the profile of Physiotherapy Research expectations was unfolded).

64. OWOEYE, I. O. (1998): The Sciences of the Human Back and Causes of Back Pain.
Journal of the Nigeria Medical Rehabilitation Therapists
(ISSN 1118 – 3489), Vol. 3 (No. 6), 1- 8.
(N. B.: In this paper, the Basic Sciences of the Human Back were described while the various causes of Back Pain were outlined).

65. OWOEYE, I. O. (1998): Low Back Pain: A Multi – Directional Physical Therapy Approach.
Journal of the Nigeria Medical Rehabilitation Therapists
(ISSN 1118 – 3489), Vol. 3 (No. 6), 36 - 41.
(N. B.: This study was carried out at Kingsbrook Jewish Medical Centre, in New York, U. S. A. For the first time, some combinations of some verities of Physiotherapeutic modalities were employed in physical management of Low Back Pain. The results indicated that the use of combination of such modalities proved more effective than the earlier method of using single modality procedures.

66. OWOEYE, I. O. (1999): The Human Back: Physical Examination and Physical Assessment.
Journal of the Nigeria Medical Rehabilitation Therapists
(ISSN 1118 – 3489), Vol. 4 (No. 7), 1-6.
(N. B.: In this article, the various methods of Physical Examination and Physical Assessments of the Human Back preceding Physical Therapeutics were described).

67. OWOEYE, I. O. (1999): Manipulative Therapy in the Management of Back Pain: Indications and Contra – Indications.
Journal of the Nigeria Medical Rehabilitation Therapists
(ISSN 1118 – 3489), Vol. 4 (No. 7), 35 – 39.

(N. B.: An effective Physical Procedure in the Management of Back Pains is Manipulative Therapy. Some Physical Therapists thus subject all cases of back pains in their hands to manipulations. In this study, this researcher found that all cases of back pains do not benefit from manipulations. For the first time, this researcher objectively identified indications and contra-indications to manipulations in the management of back pains).

68. RAJI, M. R.; OWOEYE, I. O. (1999): Burns: The Pattern of Incidence and Physical Management at the Lagos University Teaching Hospital, Lagos, Nigeria.
Journal of the Nigeria Medical Rehabilitation Therapists
(ISSN 1118 – 3489), Vol. 4 (No. 8), 48 – 54.
(N. B.: This study was carried out at a time when there were several cases of burns brought to this Teaching Hospital. This study successfully identified the causes of the burns; the study educated the public on preventive measures, and appropriate Physiotherapeutic measures were identified to effect management that prevented the usual complications of contractures that notoriously characterized the earlier cases managed in this Hospital).

69. OWOEYE, I. O. (2000): The Role of Physiotherapy in the New Millennium.
Journal of the Nigeria Medical Rehabilitation Therapists
(ISSN 1118 – 3489), Vol. 5 No. 1 (Issues No. 9) June, 2000, 1- 4.
(N. B.: The past and present practices of Physiotherapy (i.e. Physical Therapy) are known. In this paper, projections into the future practices of Physical Therapy in this new Millennium are proferred).

70. OWOEYE, I. O. and OLAWALE, O. A. (2000): Geriatrics Emphasis in the Physiotherapy Profession: The Nigerian Perspective. Journal of the

Nigeria Medical Rehabilitation Therapists (ISSN 1118-3489), Vol. 5 No.1 (Issue No.9) June, 2000, 8-10.

(N.B.: The extent of physical therapy in Geriatrics in the Advanced and Developed nations of the world is well known. The scenario is quite different in the third world. This paper has attempted to investigate the level and extent of physiotherapeutics in Geriatrics in Nigeria).

71. OWOEYE, I. O. (2000): Cardio-Vasculo-Respiratory Responses of Adults in Different Occupations to Physical Stress.
(ISSN 1118-3489), Vol.5 No.2 (Issue No. 100) December, 2000, 1-14.
(N.B.: In elaborate research studies, the researcher (Professor Isaac O. Owoeye) scientifically demonstrates the Cardio-Vasculo-Respiratory Responses of Adult s in Different Occupations to Physical Stress.

72. OWOEYE, I. O. (2001): Electrical Stimulus: A Physiotherapeutic Means for Muscular Efficiency in producing World Champions in Sports rather than Enhancement of Body Weight and Muscle Hypertrophy.
(ISSN 1118-3489), Vol. 6, No. 1 (Issue No. 11), June, 2001, 28-33.
(N.B.: This research study successfully established the effectiveness of a Physiotherapeutic means, that is, electrical stimulus for the enhancement of muscular strength and efficiency in producing World Champions in Sports).

73. OWOEYE, I. O. (2001): Transcutaneous Electrical Nerve Stimulation: Its place in Medical Management and Medical Rehabilitation.
Journal of the Nigeria Medical Rehabilitation Therapists
(ISSN 1118 – 3489), Vol. 6 No. 2(Issue No. 12) December, 2001, 1- 7.
(N. B.: This is one of the latest electrical facilities in Physiotherapy and one that is now in the hands of physical therapists for effective pain relief essentially. In this paper, the researcher has successfully identified the

indications and contra-indications for the utility of this equipment. The hindrances of this equipment were also identified).

74. OWOEYE, I. O. (2002): Petroleum Industrial Hazards: Remedial Measures including Physiotherapeutic facilities available for Preventive Measures and Management Procedures Journal of the Nigeria Medical Rehabilitation Therapists.
(ISSN: 1118 – 3489), Vol. 7 No. 1 (Issues No. 13), June 2002.
(N. B.: As at the present moment, the largest source of income for several counties the world over are Petroleum and Petrochemical Industries. This researcher is the first Physiotherapist in the world who has looked into the Hazards of these industries. In this study, he has successfully discussed the remedies of these health hazards and identified physiotherapeutic facilities for preventive, curative and rehabilitative measures).

**FUTURE RESEARCH IN PHYSIOTHERAPY**

Having appraised the advances of physiotherapy in the past and present, that is, up to date, the time is now ripe to gravitate to piercing into the physiotherapy future advances in this third millennium. On this dimension the priority is on the trend of future research in physiotherapy.

As earlier on stressed, knowledge can only be accumulated and become readily available for practical application only through research. Therefore, the continued existence of a discipline in the contemporary world largely depends on the research activities within such discipline. Some of the viable areas of future research studies in physiotherapy are:

**BIOENGINEERING**

Physiotherapists should not leave the engineers alone developing the instruments which they (i.e. the Physiotherapists) use. With the background of the pool of existing

theoretical knowledge, the physiotherapists know or at least have ideas about what instruments they need to aid them to carry out their procedures.

It is a fact that physiotherapists are extensively involved in the application of heat and cold in the treatment of several conditions, yet there has never been a way to assess at which optimal tissue temperature can a therapeutic response be obtained. While in the process of giving heat and cold there is also no way known yet to tell the degree of temperature attained by the tissues under treatment. More sensitive measuring instruments are needed which should be designed and built by the joint research studies of the engineers and physiotherapists.

**EXERCISE THERAPY**

Over the years, some outstanding personalities have developed several forms of exercises for treatment purposes (e.g. Knott and Voss, 1963; Bobath, 1970; Burnstrom, 1970). Besides the fact that some of the theories propounded by some of these authorities to back up their systems of exercise run short of the most recent neuropsychological discoveries of the human body, the instruments of their systems of exercise are equally inadequate. Therefore, the area of exercise therapy is one that affords ample research. The background theories of these exercises in the light of the recent neurophysiological discoveries need to be reviewed and further tested. This may lead to the probability of discarding some of the exercise procedures currently in use for treatment while the development of new exercise procedures looks very evident. In terms of measurements, more research studies need be undertaken with a view to develop measuring equipment that are capable of handling or producing quantitative values that are suitable for vigorous statistical analysis.

**MUSCULOSKELETAL AND NEUROLOGICAL CONDITIONS**

Another viable area of research is in musculoskeletal system including the connective tissues. The effects of exercise and immobilization on the macroscopical and microscopical structures of the bones and soft tissues need to be more investigated.

It has once been hypothesized, for example, that very vigorous active and resistive exercise is injurious to patients having muscular dystrophy. A controversy has since existed about what type of exercise can be most beneficial to these patients. Such a controversy as this can only be settled through objective research studies.

Up till now, the definitions of Fatigue and Spasticity are inconclusive. These are important aspect of some neurological conditions that need to be more investigated with a view to identify, measure, prevent, or treat the underlying conditions.

As at now there are more of clinical research by physiotherapists. In order to build on what is already known, there is need to undertake more of basic and applied research studies having a truly experimental design. In this regards therefore, all aspects of research studies i.e. basic, applied and clinical studies as it applies, for example, to reflex patterns, proprioceptive and exteroceptive reflexes, the muscle spindle and perceptional motor learning both in the normal and pathological states are necessary.

Over the recent years, it has also been speculated that motivation affects the therapeutic response of patients to the various procedures of physiotherapy. There is therefore, a need to investigate the phenomenon of motivation with a view to discover the proper means of its induction, its quantitative measurement and control in generating an improved therapeutic response.

There is no end to the expected future trend of research studies in physiotherapy. The trend is multi-direction in design and hence there is no way that every bit of the facets of the future trend of research studies in physiotherapy can be spelt out here.

**GRADUATE AND POSGRADUATE STUDIES IN PHYSIOTHERAPY**

As at now the facilities in Graduate and Postgraduates Studies in Physiotherapy are inadequate in Africa. The position is quite good in the advanced countries such as the United States of America, Canada, Australia, Europe and the United Kingdom. Virtually, the facilities for Graduate and Postgraduate Studies in Physiotherapy are grossly inadequate in Nigeria. In fact the facilities of the undergraduate studies in physiotherapy in many of the developing counties still need to be improved upon and be developed to meet up with international standards.

For now the pioneers, the leaders and the Doyens of Physiotherapy world-wide need to direct their attention to develop their facilities for graduate and Postgraduate Studies in Physiotherapy. It is only in this way that the growth in the Theoretical, applied and Clinical Physiotherapy can be accelerated.

**PERSONNEL**

Another issue, which requires attention, an urgent one for that matter, is personnel development. The physiotherapy personnel requirement in all the developing countries of the world is grossly inadequate. Even at the lowest level of the clinical practice of physiotherapy in the developing countries world – wide, the required personnel is grossly inadequate. International standards exist. There is a minimum number of physiotherapy clinicians required for specific population of people. This standard is never kept in the developing countries. Of course one hears about a physiotherapist attending to hundreds of patients per day in these developing countries. The outstanding question is how effective such few physiotherapists are!

In order to solve the problem at the basic level, all Colleges of Medicine and Faculties or Institutes of Health Sciences in all the Universities in these developing countries are encouraged to start undergraduate programmes of studies in physiotherapy.

Meaningful research studies that are scholarly and which can contribute to knowledge can only be carried out by those physiotherapists with graduate and postgraduate qualification. In order to build on the existing body of knowledge in physiotherapy therefore, all the Universities of international reputation should acquire modern research facilities and employ physiotherapy intellectuals of different specialties at professorial levels to teach and supervise graduate and postgraduate courses of studies in physiotherapy.

**EMERGENCE OF EXPERTS IN PHYSIOTHERAPY**

In future, several experts in various aspects of physiotherapy should start emerging. For example, physiotherapists should be able to acquire expertise in electromyography for diagnostic, investigative, or monitoring procedures using both invasive and non-invasive methods. Several physiotherapists should also be experts in recording and analysis of the 12 – lead cardiograph during exercise therapy or rehabilitation procedures for cardiac patients or patients of coronary heart disease. Physiotherapists should be able to use these procedures effectively in the monitoring of the cardiovascular responses to physical fitness exercise in the elderly subjects or in the management of complicated or non complicated cases of obesity.

At the moment, there are very few physiotherapists who are experts or authorities in manipulative techniques. In future several physiotherapy clinicians should acquire the expertise in these areas of therapy.

In future, there should be physiotherapy experts in different areas of learning and health cares, for examples: Physiotherapy experts in Paediatric developmental abnormalities; in Obstetrics and Gynaecology; in Geriatrics; in Medical Electronics; in Physiotherapy instrumentation; in Neurology, etc. PHYSIOTHERAPY, AN EMBODIMENT OF SEVERAL DISCIPLINE AND PROFESSIONS.

In a philosophical sense, life means activities or motion which after a period of time culminate in a natural process that is described as evolution. In this dimension, the living things as well as the Arts, Science, Engineering and Medicine including physiotherapy must necessarily undergo some progressive developments.

In the remote past, medicine was just known as a discipline, only one profession solely practiced by a family. Today Medicine has grown to become a body of many disciplines and professions such as Surgery, Paediatrics, Obstetrics and Gynaecology, Medicine, etc. in a similar manner, physiotherapy is a potential body of several discipline, and professions.

First the base in physiotherapy, in future, will be expanded. In the ensuring future, the expanded basic background of physiotherapy will expand to include: Biology, Zoology, Chemistry, Physics, Mathematics, Computer Sciences, Philosophy and Logic, Peoples and Cultures, Gross Anatomy, Neuro-Anatomy, Embryology, Physiology, Biochemistry, Pharmacology, Neuro-Biology, Radiation Biology, Electro-Physics, Nuclear Physics, Medical Electronics, Medical Instrumentation, Medical Psychology, Clinical Psychology, Sociology, Applied Mathematics, Medical Statistics, Applied computer Sciences, etc. With the expanded base as described above, Physiotherapy in the near future should be advanced to become a field of Arts and Sciences that constitute an embodiment of several disciplines and professions.

The implication of this is the current Academic Departments of Physiotherapy in the Universities will in near future, expand to become College of Physiotherapy, the Chief Executive of which must be a full Professor of Physiotherapy and designated as the PROVOST of the College. In the College of Physiotherapy therefore, must exist faculties. Each faculty as a rule must be constituted by departments. Few examples are:

I. FACULTY OF ELECTRO – THERAPY – to be composed of:
   (a) Department of Radiation Therapy
   (b) Department of Actinotherapy

(c) Department of Cryotherapy

(d) Department of Direct and Low Electrical Current Therapy

(e) Department of High Frequency Electrical Therapy, etc.

II. FACULTY OF MEDICAL REHABILITATION – to be composed of:

(a) Department of Paediatric Development Abnormalities

(b) Department of Neurological Physiotherapy

(c) Department of Hydrotherapy

(d) Department of Ambulatory Therapy

(e) Department of Activities of Daily Living OR Department of Restorative Human Activities, etc.

III. FACULTY OF APPLIED SCIENCE – to be composed of:

(a) Department of Electro-Physics

(b) Department of Medical Electronics

(c) Department of Medical Instrumentation

(d) Department of Electro-Mechanics

(e) Department of Sound Waves including Ultrasonic Energy.

IV. FACULTY OF CLINICAL PHYSIOTHERAPY – to be composed of:

(a) Department of Respiratory Therapy

(b) Department of Physical Therapy in Medical Conditions

(c) Department of Physical Therapy in Surgical Conditions

(d) Department Orthopaedic Therapy

(e) Department of Cardio – Thoracic Therapy, etc.

V. FACULTY OF COMMUNITY PHYSIOTHERAPY – to be composed of:

(a) Department of Physical Therapy in Rural Areas

(b) Department of Itinerant Physical Therapy

(c) Department of Industrial Physiotherapy

(d) Department of Geriatric Physical Therapy

(e) Department of Psychiatric Physical Therapy, etc.

VI. FACULTY OF THEORETICAL AND APPLIED PHYSIOTHERAPY- to be composed of:

(a) Department of Kinesiology
(b) Department of Biomechanics
(c) Department of Curricular Development
(d) Department of Theoretical and Mathematical Physiotherapy
(e) Department of Biostatistics
(f) Department of Computer Science in Physiotherapy, etc.

VII. FACULTY OF SPORTS PHYSIOTHEAPY – to be composed of:

(a) Department of Physical Therapy for Contact Sports
(b) Department of Physical Therapy for Non-contact Sports
(c) Department of Recreational Physiotherapy
(d) Department of Body Building and Development for Sports
(e) Department of Preventive Physiotherapy in Sports Injuries etc.

VIII. FACULTY OF MANIPULATIVE THERAPY – to be composed of:

(a) Department of Mechanical Therapy
(b) Department of Electro-Mechanical Therapy
(c) Department of Body Mobilisation
(d) Department of Message.
(e) Department of Musculoskeletal Manipulations
(f) Department of Physiotherapy in emergencies, etc.

IX. FACULTY OF PHYSICAL FITNESS– to be composed of:

(a) Department of Motor Learning
(b) Department of Body Weight Reduction
(c) Department of Physical Therapy for the Complications of Obesity
(d) Department of Cardio – vascular fitness

(e) Department of Physical Fitness (on ground, in space and under water), etc.

X. FACULTY OF THERAPEUTIC EXERCISE – to be composed of:

(a) Department of Exercise Therapy (including Exercise Prescriptions and Physical exercise Dosage)
(b) Department of Gymnastics and Medical Gymnasium Exercises
(c) Department of Exercise Physiology
(d) Department of Functional Re-education
(e) Department of Proprioceptive Neuromuscular Facilitation and Neuromuscular Coordination, etc.

Time and space would not allow this speaker to continue to enumerate other Faculties in the expected future Colleges of Physiotherapy.

As expected, the Chief Executives of the faculties must be full Professors of Physiotherapy and are to be designated as University Deans of Faculties. The head of each Department as a rule must be a full Professor of Physiotherapy. The Chief Executive of the College of Physiotherapy as stated earlier must be a Professor of Physiotherapy and designated as the Provost of the College of Physiotherapy.

**RECOMMENDATIONS**

Before conclusion, this Author/Speaker (i.e. Professor Isaac O. Owoeye) has some recommendations for Nigeria and for Nigerians.

**PERSONAL/ENVIRONMENTAL HYGIENE AND HEALTH INSURANCE**

By and large progress is steadily being made on improvements on personal and environmental hygiene for Nigerians and for Nigeria. In respect of these, **COMMENDATIONS** are given to the Ministries of Health and the Ministries of Works and Housing in all the States of the Federation. In this same respect, the Federal Ministry of Health is highly commended for proving leadership roles for the States Ministries of Health. The Federal Ministry of Health (for the Federal Government of Nigeria) is further

commended for the policy development on the National Health Insurance Scheme. The entire nation is now waiting for its take off. This Author/Speaker recommends very strongly that the National Health Insurance Scheme should takeoff soonest so that Nigeria can make history as the first country in Africa and the rest of the 3rd world to implement National Health Insurance Scheme.

In order to enhance further progress on Personal/Environmental Hygiene and Health, there is need for uninterrupted good water supply and uninterrupted power supply (i.e. electricity) in the cities and villages i.e. in urban, sub-urban and rural areas including the remote rural areas in all communities in Nigeria.

**PHYSIOTHERAPY FACILITIES**

Physiotherapy facilities for this entire nation, Nigeria, are grossly inadequate.

With reference to the records of the World Confederation for Physical Therapy (W.C.P.T) and the Nigeria Medical Rehabilitation Therapists Bulletin (August, 2001), comparative statistics by ratio of the licensed and practicing physiotherapists to the population indicate:

| | |
|---|---|
| Belgium | 1 : 960 persons |
| Norway | 1 : 1,000 persons |
| Finland | 1 : 1,3000 persons |
| Denmark | 1 : 1,5000 persons |
| Canada | 1 : 4,000 persons |
| U.S.A | 1 : 6,497 persons |
| Nigeria | 1 : 368,098 persons |

The above show that Nigerian citizens are very badly deprived of the essential services in physiotherapy.

The physiotherapy facilities in terms of personnel (i.e. physiotherapists), equipment and infrastructures in most hospitals or medical centers in Nigeria are grossly inadequate. Only five universities in Nigeria provide training programmes in physiotherapy. These Universities are:

1. University of Ibadan
2. University of Lagos
3. Obafemi Awolowo University, Ile-Ife
4. University of Nigeria, Nsukka; and
5. Bayero University, Kano.

In these few Universities, the physiotherapy training facilities in terms of Personnel, Equipment and Infrastructures are equally inadequate. A great majority of the graduates in physiotherapy of these Universities brain-drain i.e. depart from this country to accept appointments as physiotherapists in the advanced countries where the conditions of service are much more better.

In order to meet up with the physiotherapy needs of the Nigeria citizens, the following are very strongly recommended:

1. All the Federal Universities should start training programmes in physiotherapy and keeping very strictly to the regulations of the National Universities Commission (N. U. C.).

2. All the States' Universities that have Colleges of Medicine or Faculties of Health Sciences should also start training programmes in physiotherapy also keeping very strictly to the regulations of the N. U. C.

3. The physiotherapy facilities in all the Clinical Departments of Physiotherapy in all the Hospitals and Medical Centres in Nigeria, i. e. in terms of personnel,

equipment and infrastructures MUST be adequate and to meet up with international standards.

The Clinical Practice of physiotherapy is capital intensive. Therefore adequate funding MUST be provided by the Federal and State Governments of the Federal Republic of Nigeria for Clinical Practice of Physiotherapy in all the hospitals and Medical Centres in Nigeria.

4. In order to check on brain drain the Federal Government of Nigeria should seriously look into the remunerations for physiotherapy. The salaries and allowances of Doctors and Physiotherapists at the basic grades in Nigeria must be equal, after all physiotherapists now train for six years in Nigeria. In fact if the remunerations for Physiotherapists in Nigeria are adequate many of those who now work abroad will return home. After all, there is no place as good as home.

5. In the same vein, the physiotherapy training facilities in terms of personnel, equipment and infrastructures in all the Physiotherapy Training Universities in Nigeria MUST be adequate and to meet up with national and international standards.

***PROPER AND ADEQUATE NUTRITION***

To enable a patient to respond properly to medical management including physiotherapy, he or she must have access to proper and adequate nutrition. Even for the seemingly or apparently healthy citizen to maintain the state of their good health, they must have access to proper and adequate nutrition.

It is obvious that the common citizen in Nigeria has no easy access to proper and adequate nutrition. Although we are producing food items in Nigeria but the proper and adequate food items are not affordable to the common citizen in Nigeria.

This author/speaker is therefore calling on government both at the Federal and State levels to encourage the professionals in Agriculture to go into the industry of farming. After all, we have the land and the soil is good. The weather is equally too good for us. Nigeria as a country is well blessed by the Almighty God. In the United States of America for example, weather permits farming i.e. growing for only for months of the year. And for that short duration of time, they produce adequate food for their citizens of over 280 million people for the entire year and have excess for exportation to Asian countries such as Russia, China, India, Pakistan and Indonesia. The United States of America also exports food items to the United Kingdom, Europe and of course to Africa. The Government at Federal and State levels should encourage our professionals in Agriculture to go into mechanized farming so that Nigerians in general can have adequate and proper food to feed on so that out patients can respond better to treatment while the healthy ones can sustain their health.

***REHABILITATION HOSPITALS***

So far and up to date, there is no rehabilitation hospital in Nigeria.

The population of Nigeria is growing fastly while the number of those citizens with gross physical disabilities with little or no functional abilities are on increase. Many of these citizens need medical rehabilitation over several years or even for their entire lives.

Many of such conditions leading to this degree of physical disabilities are congenital in origin such as muscular dystrophy, very many varieties, Neurological conditions such as severe brain damage, Anencephaly, spinal cord injuries and several other conditions as Guillain Bare Syndrome for which no cure is known yet.

The culture of our land is fastly yielding to the dictates of the modern era. Extended family hands in caring are fastly thinning out. The adequate place to take care of these affected citizens is the Rehabilitation Hospitals.

This Author/Speaker is now strongly recommending that the Authorities of our land should look into the development and setting up of Rehabilitation Hospitals. For a start, at least one Rehabilitation Hospital in each geographical zone of our nation is required for the benefits of needy citizens.

***DEVELOPMENTS IN PHYSIOTHERAPY AT THE UNIVERSITY OF LAGOS***

Before the dreams or visions of the earlier described Collegiate Faculties of Physiotherapy come to reality i.e. the long term goals, some lesser goals, i.e. on very short term basis need be achieved with immediate alacrity.

This Author/Speaker strongly appeals to the Federal and State Governments of Nigeria for improvement on funding for Universities in Nigeria. Sequel to this therefore more funds are urgently required for the growth and developments in Physiotherapy in Nigerian Universities. Physiotherapy as we all know is capital intensive. In this Great University, the University of Lagos, Lagos, Nigeria, Physiotherapy requires more funding in respect of the development of:

1. The Infra – Structures;
2. The Facilities; and
3. For Personnel Development.

As a Professor of Physiotherapy, my priority is on setting up Graduate and Postgraduate Studies in Physiotherapy to the Standards of the Postgraduate School of the University of Lagos and to International Standards. My focus is also set on running a quality assured undergraduate programme of studies of national and international merits.

To achieve these, the following are of immediate requirements:

I. The present building of the Academic Department of Physiotherapy at the College of Medicine, University of Lagos at Idi – Araba, needs to be elevated to three additional floors. These four floors are for:

(a) Administration, on ground floor;
(b) The Undergraduate Programmes of Studies to occupy the second floor;
(c) The Master's Degree Programmes of Studies to occupy the third floor; and
(d) The Doctorate Degree Programmes of Studies to occupy the fourth floor.

Within the complex are to be lecture halls, seminar rooms, research laboratories; department library and offices for members of staff.

II. For now there are no modern facilities in terms of equipment for professional training of students. Research equipment of international standards are equally not available. More teaching aids and audiovisuals are required. These will certainly attract good funding.

III. In respect of personnel development, we need to attract to our services in physiotherapy high caliber teaching and research staff. Most of the staff on ground as at now require further advanced training. As at now, we have only one professor of physiotherapy on ground; there are no associate professors while there is only one senior lecturer on ground. If improved conditions of service as being pursued by the Academic Staff Union of Universities (ASUU) can be achieved; if national security improves; and if general conditions of amenities can improve at national level, then many Nigeria experts, professors in physiotherapy who now are working abroad can return home and be engaged in our services in physiotherapy in this Great University, the University of Lagos, Lagos Nigeria.

**A STOP OVER:**

Having traveled far and wide, the points of calls most of the time being Universities, this Author/Speaker is glad to pronounce that the Postgraduate School of the University of Lagos is rated very highly and is of very high international reputation. For this, I am raising golden Commendations to the founding fathers of our University and of course to the current Vice-Chancellor and the current Dean of the Postgraduate School of our Great University, the University of Lagos, Lagos, Nigeria.

**FURTHER RECOMMENDATIONS**

Continuing with recommendations for immediate and urgent needs of physiotherapy in our University, a minimum of a Departmental Car is required. This Author/Speaker, Professor Owoeye over the years continue to use his personal car, driven by himself for official duties. The Department of Physiotherapy, College of Medicine, University of Lagos is growing. The former three – year programme of studies in physiotherapy is today a six – year programme of studies i.e. including a year of physiotherapy professional internship. A Departmental Bus is now urgently required in addition to convey the students and staff to outside and out of town student postings. When the environment is tidy and conducive conditions of service exist, then there will be room for further growth and developments. Our personnel developments can then flourish. We can then be in a position to produce many professors of Physiotherapy.

**CONCLUSION**

As an addendum to the definition of Physiotherapy earlier given, Physiotherapy respects the dignity of the individuality. Unknown to many people, no two people are exactly alike; no two people dance alike except on training; no two people talk alike; no two people even laugh alike, etc. No one sees his or her own back view during bio-medical activities as in walking, dancing, etc Self view through mirror may sometimes be deceptive.

This inaugural lecture, titled: "THE ADVANCES OF PHYSIOTHERAPY" has touched on many frontiers, the past, the present and the future trends of developments in physiotherapy.

It can very simply be concluded hat everybody here present: the authorities; members of the press; the audience; the students; the universities dons; the Nigeria Governments; Federal and States; all Nigeria citizens and all residents in Nigeria should keep in mind all that have been delivered in this lecture and to work towards or assist in any way possible making the dreams, the visions and the recommendations of this lecturer to fruition and reality. After all, HEALTH IS WEALTH. Healthy citizens make a Healthy Nation and a Healthy Nation is a Powerful Nation.

Without any iota of doubts, the implementation of the recommendations for the immediate and far future as presented in this lecture, that is, in the physiotherapeutic training, research, clinical practice and administration will certainly lead to a vary high advancement for PHYSIOTHERAPY. Indeed and in truth if most of these dreams and ideas are fulfilled or achieved, Nigeria as a nation will be better off and the physiotherapists of this era will be proud of having a highly advanced field of knowledge in physiotherapy to be handed over to posterity. All the recommendations and the future projections as offered by this Inaugural Lecturer are possible, after all, the Utopia of the yesteryears have become the realities of today.

**CONGRATULATIONS!**

The GRACE and the BENEVOLENCE of the ALMIGHTY GOD at His own discretion is heavily showered over the land called "NIGERIA". Indeed and in Truth, Nigeria is God's Own Land. The nation, Nigeria is very richly blessed by the Almighty God in human and materials resources. Nigerians are very intelligent people. With this background, this Author/Speaker has in stock Congratulations for the country, Nigeria and some sectors of the Nation.

First on this Author's/Speaker's list is the University of Lagos. Vice- Chancellor Sir, please accept the Hearty Congratulations of this Author/Speaker for the greatness of this University. The University of Lagos is luckily situated in Lagos State, the state of Aquatic Splendour and a State of Excellence. The nearby Atlantic Ocean, the offshoot of which is the Lagoon that borders the University of Lagos Main Campus on the East gives the University of Lagos, a beautiful terrace which no other University has in Nigeria. The edifices of the SENATE Building, the Main Auditorium, the Faculties' Infrastructures, the University of Lagos Postgraduate School, the Halls of Residence for Students, the Sports Centre which is comparable or even superior to many Sports Stadia, the University of Lagos Medical Campus at Idi-Araba – the College of Medicine of the University of Lagos and her twin sister i.e. her Teaching Hospital, i.e. the Lagos University Teaching Hospital, etc. all combine to make University of Lagos, the greatest University in Nigeria.

Besides the infrastructures, the experts, the leaders, the authorities are overwhelmingly around and on ground at the University of Lagos. With the effect of brain-drain, several specialties in other Universities in Nigeria have no experts. Please note that the Professors are the experts, the authorities and the leaders.

Vice-Chancellor Sir, this Author/Speaker is excited in saluting and CONGRATULATING you because you have the Experts overwhelmingly around you and on ground in all Specialties in all Faculties as Education; Arts; Business Administration; Natural, Physical and Applied Sciences; Engineering; Law; Environmental Sciences; Social Sciences; Medicine, Medical Sciences; Physiotherapy; Dentistry; Pharmacy, etc., etc. Vice – Chancellor Sir, with all these Experts around you whose brains you have the right to tap when necessary and with these Experts constituting a very powerful Senate under your intellectual and administrative leadership, it is very obvious Sir, that you are the richest man in our community. Sir, you have the power to retain these experts even beyond the time of their retirements when their expertise and essential services are required.

Next on the list of this Author/Speaker for Congratulations is the Lagos State Government. The city of Lagos happens to be the commercial centre of Nigeria. In fact, Lagos City is the political nerve centre of Nigeria too. The achievements of the Lagos State Government through her Ministries of Health and Works are very highly commendable. The provision of free Ambulance under medical emergency, the free medicare, public education of HIV and AIDS and the leading roles of the Lagos State Ministry of Health under the effective initiatives, control and management of the Hon. Commissioner of Health, Dr. Leke Pitan on preventive measures of HIV and management of AIDS patients are outstanding achievements, setting the pace for other states of the Federation. Your Excellency, the Executive Governor of Lagos State, Asiwaju Bola Tinubu and members of Lagos State Government, please accept my Heart Congratulations!.

**APPRECIATION AND GRATITUDE**

The highest appreciation and most profound gratitude of this Author/Speaker i.e. Professor Isaac O. Owoeye are for the ALMIGHTY GOD, THE CREATOR OF THE HEAVENS AND THE EARTH. A lot of water has passed under the bridge. The beginning of this Author/Speaker, his formative years and the later years of realizations are all due to the GRACE AND BENEVOLENCE OF THE ALMIGHTY GOD, To Him, THE ALMIGHTY GOD BE PRAISE, ADORATION AND GLORY.

The next point of call for gratification is my parents, both of whom had passed beyond and now dwell with God eternal. May their gentle souls rest in Eternal Peace. When I was in Primary Two Class, I had very serious experience. The only parent I knew then was my father, I was too close to him. He called me “Baba” and when people challenged him for calling me “Baba”, he would respond: “look at his face, an old man’s face of my father”. When he called me “My father”, I called him my Master. At that early childhood, I only ate the food he gave me. I could do without food even for two days when he was not around. One morning, while I was in Primary Two Class, people said “The Man died”. I could not understand. After the burial, I asked for him and I was told

he was dead. I couldn't understand the vocabulary, I asked "where is he?" People told me he has gone!!! I dashed into the forest, the thick wilderness, looking for my father since they said, he has gone. My father been a farmer, I started going from one jungle to another. Although I was born into a Christian home and baptized at birth, after my third day in the wilderness, I had a Divine encounter; I met Christ (Jesus Christ) and was born again. T he experience of the Divine Light was too profound. In the wilderness I was taken care of . meanwhile, my teachers and the Missionaries were searching for me.

According to their reports I was told that I was found on the seventh day. Of all the dangers of the wilderness, I was safe under divine protection. PRAISE GOD. Halleluyah!

Ladies and Gentlemen, you could see how tough life had been over the years for this Author/Speaker. Ever since, I have been a students, a learner and a traveler. Under God's protection and God's Blessings, I have traveled to several lands, several countries, learning and disseminating knowledge.

My profound gratitude goes to my teachers and my classmates who played prominent roles in my life. The names are too many to enumerate. My first year in Primary School was one of fantasy, the memory of which I could not recollect. But from Primary Two I became conscious of my experiences and Divine encounters. I had many nick names, some of which are "Iwe", "Ori Isiro", "Reverend Father", and "Professor". In later years particularly while on Graduate and Post – graduate Studies in the United States of America, I had additional nick name: "Isaac, the prolific writer".

I am next expressing my profound gratitude to the "Unknown Professor". While in Primary Three Class, a Professor visited our class. He was accompanied by the Headmaster. He came and addressed us. He used a pair of glasses and taught us the art of fast reading; how our eyes can read four or five words at a glance. From these he progressed to how we can read three or four lines at glance. He asked us to set him an examination by giving him a voluminous book. We did and he finished reading it in five

minutes. He answered correctly all the questions posed to him by our teachers. From that day I had my childhood axiom that I must become a professor but then believed that all professors use reading glasses because we believed then that they have too many books to read and to write and hence a professor needs more than two eyes but rather, four eyes. The name of the unknown Professor was lost in memory but myself and my three other classmates vowed that we must also become professors. One of these my classmates who is now resident in Western Germany, when we met about seven years ago proclaimed "Isaac, you are not a professor yet". When I asked how did he know, he said because he did not find me using a pair of glasses.

Ever since I have studied and worked under the supervision of great teachers, clinicians and professors. The names of many of them are lost in memory. I can recall my experiences as class monitor, senior prefect and chief monitor, I recall another childhood axiom of mine as: "No University Degrees, No Marriage". I am once again expressing my profound gratitude to the great teachers, who are great Masters, Clinicians and Professor who taught me, instructed me on clinical work in several Medical Centres and the Professors who supervised me in a number of research laboratories in some medical centers particularly in the United States of America. I am also profoundly grateful to many Godly men, Reverends and Reverend Fathers who were involved in my childhood upbringing. Although I lost contact with most of them over the years, but God who knows them all and who knows where they are now, will reward them abundantly on my behalf.

Next are members of my immediate family, my wife and children. I want to express you all my unreserved apology because many times when you needed my company in those by gone years, I was called on emergency to attend to critically ill patients in the Hospital. I traveled a lot, in fact I am a traveler and I believe you usually miss my presence whenever I am on such travels. Even when I am home, on many occasion you could not reach me because I used to lock up myself in my study room writing. I am almost a professional writer. My beloved wife and my dear children please accept my

profound gratitude for your understanding, patience and assistance. May the Almighty God bless you all abundantly.

I want now to say THANK YOU to some eminent leaders in this Great University Professor Elebute, ex-Provost and Professor Amaku, the foundation Dean of the School of Clinical Sciences, College of Medicine, University of Lagos. These are the two principal officers who got me employed as Lecturer II when I arrived on the shores of the continent of Africa, in November, 1979. Vice – Chancellor Sir, Distinguished Ladies and Gentlemen, I have ever since been here on God's Special Mission, I am now thanking the Almighty God for sending me to Africa, particularly to Nigeria and specifically to the University of Lagos in this Special Mission. Professors Elebute and Amaku are wonderful intellectuals. I enjoyed working with then and from the depth of my heart I am now saying THANK YOU Sirs. Professor Deji Femi – Pearse, another ex-Provost, College of Medicine, University of Lagos is another great personality that I cannot forget. When I was findings life difficult and was contemplating departing Nigeria to travel across the oceans, he discovered; how? I could not tell. As Provost, he called me and gave directives and orders to solve those tantalizing problems and hence I have remained in this great University up till today. Professor Deji Femi-Pearse please accept my profound gratitude.

I want to thank further some principal officers of this University i.e. at the Main Campus here with whom I worked some years back. Outstanding among them is Professor Vincent, the Chairman, Ceremonies Committee for several years I worked with him as member of the ceremonies Committee. In 1992 the Ceremonies' Committee under the able leadership of Professor Vincent organized the 30$^{th}$ Anniversary of the University of Lagos. Besides all the selfless services and the heavy schedules of activities of organizing the 30$^{th}$ Anniversary of the University, Professor Vincent cooperated with me in mounting the first Physiotherapy Exhibition i.e. in 1992. Professor Vincent, please accept my profound gratitude.

I want to thank next my students over the years. These students, who today are in several lands outside the continent of Africa are the products of hard work. When people remarked: "These students are disciplined, very dedicated, very diligent and very resourceful", someone is usually on hand to comment very loudly: "Like the Master like the Students". To you, these my good ex-students wherever you may be you have my blessings and may the Almighty God be with you always.

Time and space will not allow my going on and on to mention names but to all the Principal Officers of this University both at the Main Campus here and at the College of Medicine University of Lagos, Idi – Araba; as well as at the Lagos University Teaching Hospital, Idi – Araba, both academic and non-academic with whom I have worked over the years, please accept my profound gratitude.

And finally, to you Vice-Chancellor Sir, please accept my profound gratitude for giving me the opportunity of delivering this my inaugural lecture. May the Almighty God bless you abundantly and continue to enrich you with wisdom of providing outstanding leadership in academia at this great citadel of learning.

Vice-Chancellor Sir, please permit me to thank all those who are here present today to listen to this inaugural lecture. In particular to thank all those who have traveled from afar in order to be here to listen to this lecture. I wish you all God's traveling mercies. I want to express my profound gratitude to some of my great teachers who are here present; to the Doyens of Physiotherapy in Nigeria and in Africa here present; to pioneers, authorities and leaders in physiotherapy here present; to the Chairman and members of Medical Rehabilitation Therapists Board of Nigeria here present; to the Excellencies and Honourable Ministers and Honourable Commissioners here present; to Government Officials from Federal and States here present; to my Lords, Spiritual and Temporal here present; and to the Principal Officers of our University and the Lagos University Teaching Hospital here present.

**CHARGE TO HUMANITY**

Finally, at this unique point in time, that is, at the early part of a new decade, a new century and a new Millennium, what are the targets or goals of humanity? This speaker, Professor Isaac O. Owoeye would like to believed and to reaffirm that the targets or goals of humanity for the new DECADE, for the new CENTURY and for the new MILLENNIUM must be:

Outstanding Scientific breakthroughs;
Outstanding Medical breakthroughs;
Attainment of new dimensions in Medical Rehabilitation;
Unprecedented technological achievements;
Attainment of the highest heights in industries and commerce;
Attainment of the highest level of human civilization
Eradication of all deadly disease;
Health for all;
Profound LOVE among humans that cuts across all human communities and across all the races of this world;
Kindliness towards one another among all the people of this world;
Political and Religious harmony among all human communities worldwide; and
The long awaited PERFECT PEACE on Earth i.e. including perfect peace between man, machine and the environment, (Owoeye, 2001).

May the Almighty God, the source of ALL that is good and noble, the source of knowledge and wisdom, the Creator and Giver of ALL Blessings, continue to endow each and everyone here present today and to endow this citadel of learning, the Great University of Lagos with progress moving this entire nation, Nigeria, forward. May our intellectual light dispel all shades of ignorance from all parts of this country, Nigeria. And finally, may we, as the Great University of Lagos, with the Grace of God, continue to shine our academic light of Excellence nationally and internationally.

Vice-Chancellor Sir, Principal Officers of our Great University, the University of Lagos, very important personalities here present, my Lords, Spiritual and Temporally, my dear good students, members of the Press, Distinguished Ladies and Gentlemen, I thank you all for your patience in listening to me.

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