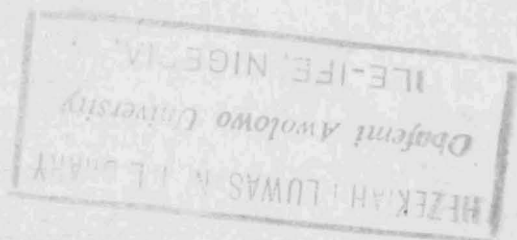


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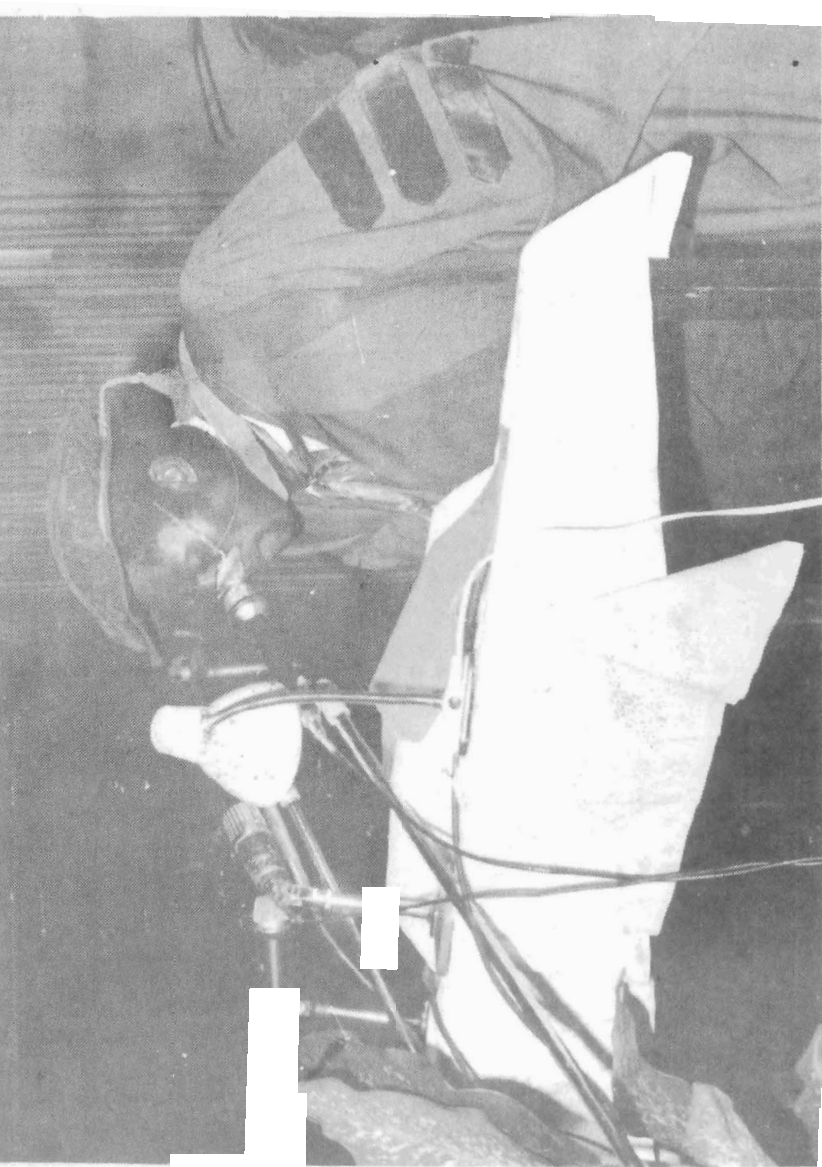
Inaugural Lecture Series 77

**GENESIS, TREATMENT
AND PREVENTION
OF BACK PAIN**

By V.C.B. Nwuga



OBAFEMI AWOLOWO UNIVERSITY PRESS LIMITED



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Inaugural Lecture Delivered at the University of Ife
(now Obafemi Awolowo University)
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When I was thinking about what topic to pick for my inaugural lecture I had no problem picking the present one on back pain. In many quarters my name has become synonymous with back pain and its treatment. In fact one of the congratulatory letters I got after my chair was announced said: "Mr. Back Pain; so you made it to the top despite your problem". Many of you here today who have suffered but have been 'cured' under my torturing hands can confirm this.

This lecture intends to look at the nature of back pain and the conventional management of this irksome syndrome. A large portion of the presentation will focus on the use of manipulative therapy in its treatment. This of course, is the area where I have made my professional and scholastic contribution. This will be followed by hints on its prevention and then recommendations.

THE NATURE OF BACK PAIN

Like the common cold, back pain represents one of the most common menacing complaints seen in clinical practice. When it persists for long periods, it may constitute a disability which tries the patience of the most stoical individual as well as the physician who treats the suffering victim. Back pain is merely a symptom description that includes two main components. First, there is pain that is experienced or perceived on the back surface of the body, an area that extends from the occiput to the gluteal folds and outwards to the lateral margins of the neck and trunk. Secondly, there is pain presumed to arise from back structures, particularly, the vertebral column and its related tissues; this ex-

tends the concept to embrace a variety of complaints referred to the shoulder region and the leg.

Despite its occasional failures at inopportune moments, the back is a marvel of biological engineering. It is not only the body's principal scaffolding, on which the skull, ribs, pelvis and shoulder bones are all anchored, it also serves as the major conduit for the bundle of nerves—the spinal cord—that links the brain with other parts of the body.

The spine consists basically of bones called vertebrae which are separated and cushioned by pads called discs. So artfully are they sculptured that they fit neatly into one another. An intricate system of muscles, tendons and ligaments keeps the column from collapsing. From the base of the skull through to the bottom of the tailbone, there are thirty-three or sometimes thirty-four vertebrae contained in five sections or regions. There are seven vertebrae in the neck or cervical region; twelve in mid-back, known as the thoracic or dorsal region (these are the vertebrae attached to the ribs); and five vertebrae, the largest of the lot, in the low back or lumbar region. The two immobile sections are the sacrum and the coccyx.

To appreciate the architectural complexity of the spinal column one must realize that there are three joints at each vertebral level. At the thoracic level we have two extra joints in each of the 12 levels formed by the head of the rib and the body of the vertebra. Back pain could emanate from anyone or more of these joints. These joints are the series of cartilaginous joints between the vertebral bodies and a series of synovial joints between the vertebral arches, all fitting together

in a manner that pleases the eye.

In epidemiological studies performed in Sweden, England² and Israel,³ it has been demonstrated that 70-80 percent of the populations in modern industrialized societies will suffer from back pain sometime during their active years, the majority between 20-55 years of age. Our experience in Ife supports this degree of prevalence.⁴ The huge economic toll which back pain takes on communities is unquestionable. Great Britain for instance loses about 5 million working days a year due to back pain among workers.⁵ Americans, in their often futile quest for relief, now spend \$5 billion a year for tests and treatment by a dizzying array of back specialists, including orthopaedists, osteopaths, physical therapists, and chiropractors, to say nothing of self-styled gurus who promote every manner of cure. Billions more are paid out in disability claims, lawsuit awards and other settlements resulting from back injuries.

CAUSES OF BACK PAIN

When discussing back pain in this lecture, I will be referring to the so-called idiopathic or the common back pain. One is not unaware of the fact that some conditions may disguise themselves in the form of back pain. These include cancerous growths in the vertebrae or at distant parts of the body, visceral problems like kidney stones or gravid uterus, dissecting aortic aneurysm, tuberculous spine, ankylosing spondylitis and so on. These conditions fortunately constitute only a minuscule percentage of back pain among patients.

In anthropological circles, it is believed that back pain is the price that man is paying for changing from

the quadruped to the bipedal position over a period of over a million and half years. The insectivora are now recognized as the probable ancestors of all placental mammals. From this origin the placentals branch in many directions and along a great variety of evolutionary lines. In recently accepted classification, the mammals are divided into large groups designated as cohorts: ungulata, glires, and ferungulata. Man is classed as a primate under the cohort ungulata (clawed mammals). The process of evolution which took man from the quadruped position to the erect position had specific effects on body functions. Some of these were:

1. The size of the lower limbs and trunk were increased.
2. The strength of the extensor muscles increased, while the strength of the flexor muscles decreased.
3. There was an increase in the number of neuromuscular mechanisms involved in order to achieve and maintain balance and these permitted a greater degree of eye-hand coordination.
4. The circulatory system took a retrograde step in terms of the arterial blood reaching the head, and the venous blood returning from the lower limbs to the heart. Both had to counteract gravity.
5. The respiratory system was not as effective as in the quadruped position since the inspiratory system had to counteract the force of gravity.

While crucial adaptive events were taking place, the human spinal column did not change in accordance with new functional demands. Prior to this time the spine was simply a length-maintaining mechanism, a connector between the thorax and pelvic girdle. It did

not have to deal with flexion stress. The spine therefore experienced nothing but embarrassment when it had to cope with compression forces as a result of man's new bipedal status. It was not designed to do this, that is, bear the body weight. The architectural modification which was needed was for the spine to rotate through half a circle, thus reversing itself back to front. Unfortunately the process of evolution had moved too fast to allow for this adaptive change to occur. We may have to wait for some 1 million more years for that to happen.

From a functional viewpoint, probably no other part of the skeletal system suffers from greater insult than the spinal column. The gymnast who constantly does the flip, the housewife who goes through countless flexion/extension motions and the labourer who subjects the discs to enormous compression forces are but a few examples. Back pain is therefore, probably, a cry of protest from heavy overload for which the back was not originally designed to withstand. On the other hand many veterinarians have been able to demonstrate that quadrupeds like horses, goats and cats also suffer from back pain syndromes.^{6,7}

Most authors who have attempted to examine and explain this multifaceted conundrum have directed their attention to one or two facets and have tried to over-emphasize certain aspects of the problem.

For many years the diversity of symptoms emanating from the spine puzzled the medical profession which did not recognize their source until Mixter and Barr's work partially clarified the problem in 1934.⁸ Prior to this time, Sir William Gowers, the renowned British surgeon had in 1904 published a paper in the *British*

Medical Journal stating that back pain (then popularly known as Lumbago) was caused by inflammation of the fibrous tissues in the sacrospinalis muscles.⁹ He coined the word "fibrositis" which was to be on many a doctor's lips for a long time. Nobody challenged Gower's postulate until 30 years later when Mixter and Barr showed that sciatica could be the result from the posterolateral protrusion of the disc substance. In 1945 Cyriax published an article showing that lumbago was a result of low lumbar lesion and he pointed further that it was due to a sudden backward protrusion occurring centrally, bulging the posterior longitudinal ligament and compressing the dura mater.¹⁰ Cyriax, in 1948, finally debunked fibrositis.¹¹ But the Gowerian ghost could not be easily laid. The consequence of attribution of back pain to a muscle lesion when evidence was pointing to a vertebro-mechanical source steered medical thinking along a false direction. Therapeutic approach was of course rationalized along these lines and physical therapists were requested to apply what must have been nearly worthless treatments by well-meaning physicians and surgeons. This legacy from Gowers still resists extinction in many quarters till today.

The primary causative factor in some cases of back pain is usually due to degenerative changes of the nucleus pulposus and the annulus fibrosus of the intervertebral disc. With an imposed overloading of the vertebral column in a faulty biomechanical alignment, these degenerative changes usually result in herniation of the nucleus pulposus of the intervertebral disc.

Pain causation resulting from disc rupture has a mechanistic basis. One would think that removal of herniated material pressing on the nerve root would solve

the problem by removing the alleged root cause. This seems too sanguine. The problem is far too complex as evidenced from observations from various surgical procedures which have a mechanistic rationale. The results of these operations have not been gratifying. Kravenbuhl and Zander have analyzed the results of Weber who has made an accurate follow-up study of 159 patients operated on for disc protrusion.¹² Surgery was able to relieve back pain and sciatic symptoms in 40 percent of the patients. Aitken, after observing results of surgical operations on patients in industry, mentions that a sizeable proportion showed very low rates of return to work and sought repeated operations for pain relief.¹³

Some authorities have focused attention on posture. A study was conducted among the primitive Bihl tribe in the jungles of Rajasthan, Madhya, Pradesh and Guherad in India,¹⁴ by Farhni. The results of his analysis of their posture suggest that these people hold themselves in a spontaneous and untutored manner which approaches the mechanical ideal. He observed that back pain was an unknown quantity among this tribe. He lamented that if only modern man could borrow a leaf from the Bihl, he would greatly reduce his susceptibility to back troubles.

The mechanisms associated with some forms of back pain are reasonably understood. These include visceral conditions like renal disease, and cases of pregnancy. Incidentally, in a study we conducted here in Ife we found out that 90 percent of pregnant women had experienced back pain mostly around the sixth and seventh months of pregnancy. The origin of this pain has been attributed to relaxation of ligamentous struc-

tures in the spine and pelvis and direct pressure caused by the gradually enlarging uterus and alterations in body mechanics.¹⁵ Fortunately, after childbirth the problem was solved in most cases. But available evidence only gives us a partial understanding of the cause or patho-physiology of many cases of back pain. The various theories and hypotheses presented are ideologically appealing, conceptually glamorous, scientifically dubious and only partially substantiated.

The mechanistic theory of subluxation enunciated by chiropractic has been subjected to scrutiny at various times. This theory postulates that back pain is caused by interference with nerve transmission due to pressure, strain or tension upon the spinal cord or spinal nerves as a result of body segments of the vertebral column deviating from their normal juxtaposition. Crelin in 1974 published an interesting paper which was geared towards investigating the validity of the chiropractic theory of subluxation in back pain causation.¹⁶ Crelin is still a Professor of Anatomy and Chairman of the Human Growth and Development Study Unit at the Yale University School of Medicine, New Haven, U.S.A. He studied the effects of applying stresses on the cadaverous vertebral columns of 6 individuals. The specific purpose of the study was to investigate whether there was interference with nerve transmission resulting from deviation of the body segments of the spine from their normal juxtaposition. Metal vises were clamped to the platform of a drill press to give support to the experimental spine while a compressive force was applied. Crelin found that after applying 200 pounds (90.70 kilograms) to the adult spine, the relationship of the spinal nerve to its inter-

vertebral foramen remained unchanged. He even applied 1000 pounds (453.50 kilograms) to one of the vertebrae. Even though this caused a collapse of the vertebral body, the relationship of the nerve to its intervertebral foramen remained the same. When the spines of the subjects were maximally twisted, flexed in the forward direction and side-flexed, the spinal nerves did not show any significant sign of pressure. Crelin's study experimentally showed that the chiropractic theory of subluxation could not be justified.

The riddle of back pain is dramatized by Nachemson, the world-famous Professor of Orthopaedic Surgery. After having being involved in researching into the aetiology of back pain for 25 years, he admitted that he had not yet found the solution. May I re-echo his lament: "No one in the world knows the real cause of back pain and I am no exception."

As a last resort, one may consider the cause of backache to be psychosomatic. Let it never be forgotten that pain which is unrelieved in spite of treatment sooner or later produces an anxiety neurosis. Such pain cannot be treated by psychological means. The psychoneurosis usually clears up spontaneously once the physical cause is removed. In a study we conducted here in Ife in 1982 it was shown that there was a significant relationship between stressing life events and quality of low back pain.¹⁷ Moreover we also found out that some patients with certain personality traits ran a less good chance of getting well irrespective of treatment than other patients

Because back pain is of pluricausal aetiology, chaos still reigns in the diagnostic arena with rheumatologists, neurologists, orthopaedic surgeons, neurosur-

geons, gynaecologists and psychiatrists to say nothing of general physicians and surgeons all trying to classify the problem according to their own nomenclatures. For those of us who are unfamiliar with some of these jaw-breaking terminologies, aetiology refers to the science dealing with the causes of a disease. Diagnostic epithets like disc lesion, facet lesion, slipped disc, lumbalgia etc. are in common use as if everyone aspires to emulate the proverbial Humpty Dumpty in *Alice in Wonderland* who said "When I use a word it means just what I choose it to mean".¹⁸

CONVENTIONAL TREATMENT OF BACK PAIN

The therapeutic strategies utilized in dealing with back pain are many. This is because of the pluricausal nature of its aetiology as previously mentioned. It is therefore often difficult to arrive at a precise diagnosis which could be used as a basis of rational treatment.

The most commonly prescribed remedy for back patients, at least by orthopaedic surgeons and doctors of physical medicine, are various types of physical exercises, lumbar traction and cervical traction. Different flexion and extension exercises have been recommended in order to increase the mobility of the spine and the strength of abdominal and back muscles. It however remains to be shown that strong muscles protect the back from painful episodes and no evidence has yet been presented that subjects with low back pain possess particularly weak muscles. In a paper I read in Stockholm, Sweden, at the World Confederation of Physical Therapy in 1982, it was clearly shown from a study conducted here in Ife that there was no

significant difference between the therapeutic effects of short-wave only and short-wave combined with isometric exercises in the management of back pain.¹⁹

Rests in bed with a foam mattress on a fracture board during the acute phase is often prescribed. Various modalities like short-wave diathermy and hot packs, transcutaneous electrical stimulation, biofeed back and acupuncture are used. In acute cases, the back may be put in Plaster of Paris jacket for some time to immobilize the back. Cryotherapy or treatment with cold is also used sometimes. Ultrasonic therapy for its analgesic effect is useful. We have showed in a paper published in *Archives of Physical Medicine* in 1983 that ultrasonics is significantly effective in the treatment of back pain resulting from prolapse of the intervertebral disc.²⁰

In Sweden, the 'back school' concept is quite popular. This involves individual treatment, group treatment and instruction regarding general back care, postural education and home program.

In some cases invasive procedures may be used. An invasive procedure refers to any active infiltration and destruction of tissue. These come under the precinct of surgery. These include excision of anomalous cervical rib, discotomy, laminectomy, foramenotomy, fenestration, spondylotomy, decompression and root trespass.

Even more controversial than surgery is the injection of an enzyme called chymopapain into a ruptured disc. Extracted from papayas, or pawpaw (or *ibepe* in Yoruba) a well-known tropical fruit, the substance is similar to one of the ingredients of meat tenderizers, which are made from the same plant. Developed in the

early 1960s by Orthopaedist Dr. Lyman Smith in the U.S.A., the treatment is designed to dissolve the disc's gelatinous pulp and eliminate the need for an operation. However, up till now, there is still intense debate about the efficacy of this method.

It is true that analgesics (aspirin), anti-inflammatory drugs (phenylbutazone) or muscle relaxing drugs (chlor-mezamone) relieve low back pain. However, they are only good when used on a short-term basis. Chronic use of these drugs even in moderate or therapeutic dosage, exposes the user to some risk from undesirable side effects.

It can be seen that the treatment of back pain is not easy. Traditional methods of treating this problem in the form of heat, massage and exercises still have their place but in many instances they bear the tinge of an anachronistic approach. In many cases they stand as relics of the days when back pain was believed to have a muscular basis. In addition to what has been said before, there is one thing in dealing with the back that makes it different from other orthopaedic problems. The cause of symptoms can rarely be attributed to a pathological condition affecting only one structure. In other systems in the body it is almost always possible to ascribe symptoms to one pathological condition. Symptoms in the back most often arise from two or more pathological conditions. The living anatomy of the back is so constructed that (1) no single segment of the vertebral column moves during normal voluntary movement without all the other segments moving; and (2) the hard structures of the spine, because of the compactness of the components of the vertebral

column, seldom are damaged without damage being done to the soft tissues supporting them.

MANIPULATIVE TREATMENT OF BACK PAIN

My interest in manipulative therapy started during my undergraduate days in England. I observed with dissatisfaction the treatment of patients with back pain with traditional modalities at the hospitals where I had my clinical training. Some of these patients improved but a sizeable number either derived a transient relief or none at all. Many of them became despondent and decided to seek relief from their distress by consulting osteopaths, chiropractors and other lay manipulators. I followed up the progress of these patients and discovered to my surprise that their visits to these manipulators paid off. This was a pointer to the gap in my training and I decided to rectify this apparent deficiency. A major part of my presentation today is an attempt to share with you what I have learnt since those days.

First, let us look at the origins of this modality.

Historical Review

Manipulative therapy has a respectable history, having been practised by famous physicians of old. The first documentation of this modality was made by Hippocrates, the father of modern medicine who lived between 460-375 B.C. Galen, who lived between 262-131 B.C., made reference to the manipulation of the spine for alignment in a patient following trauma to the neck.²¹ Historical evidence from Crete in 900 A.D.,

Arabia in 1000 A.D. and Turkey in 1485 have shown that crude manual therapy methods were used in treating back problems.^{22,23} Ambrose Pare (1550-1590), the famous French barber-surgeon during the Renaissance discussed in detail, fixations of the spine.²⁴ Robert Maigne in France tells the story of the celebrated Dr. Corvisatt, the Physician-in-Chief of the Emperor Napoleon.²⁵ At one time he was called to see his patient who was suffering from an acute case of back pain. He treated the great Emperor by asking him to lay across the table and then delivered a violent slap on his buttock. The Emperor's back pain was cured by the sudden twisting of the back in reaction to Dr. Corvisatt's impudent treatment amounting to an auto-manipulation. It is a true story!

In 1976, my first book, *Manipulation of the Spine*, was published by Williams and Wilkins Company in the United States.²⁶ A second book titled *Manual Treatment of Back Pain* was published this year by Krieger Incorporated, also in the United States.²⁷ For the first time, in the first book, an attempt was made to make some sense out of the rationalities and irrationalities endemic in published materials on the subject. In the two books (particularly in the second book), I attempted to synthesize the various conceptual modes and schools of thought and to evolve a new but hybrid system of back pain management using manipulative therapy which I am sure Hippocrates would have approved!

At this point I have to pay tribute to Dr. James Cyriax, former consultant orthopaedic physician, St. Thomas' Hospital, London and Dr. Alan Stoddard, former consultant in physical medicine, Brook Hospi-

tal, London. Dr. Cyriax is now 90 years old while Dr. Stoddard is 72 years old. They were my mentors in those days. My therapeutic system has been very much influenced by the work of these two gentlemen who are regarded as two of the world's best authorities on the subject.

The system of mobilization which I have evolved is currently being used all over the physiotherapy world. In the United States and Canada my techniques are collectively described as the Nwugarian method—a distortion of my name which I do not object to! The popularity of my method rests on the fact that one need not bother about the cause of the back pain but rather to nudge into it in the correct manner and wait for the result. Anybody who has had the fortune or misfortune to have been my patient can testify to this fact. I use the word misfortune here because my treatment could be quite painful sometimes. From my records I can honestly boast of 95 percent success post-treatment with a low relapse rate of 5 percent among patients who have passed through my hands. Over the last ten years I have seen 372 patients resident on the Campus and only 18 have had to see me again after the initial treatment sessions. In fact over the last three years I have noticed a significant drop in the number of patients referred to me to have their back pain looked into. I have asked myself why. Is it because I have managed to rid this Campus of back pain, at least among those who have seen me?

Now, at this point let us ask the question: What is manipulative therapy? Manipulative therapy by definition connotes the application of accurately determined and specifically directed manual forces to the body. It

aims to improve mobility in areas which demonstrate restriction, to relieve pain and discomfort and enhance the patient's well being after a careful examination.³³ Figures 1, 2 and 3 show some treatment techniques

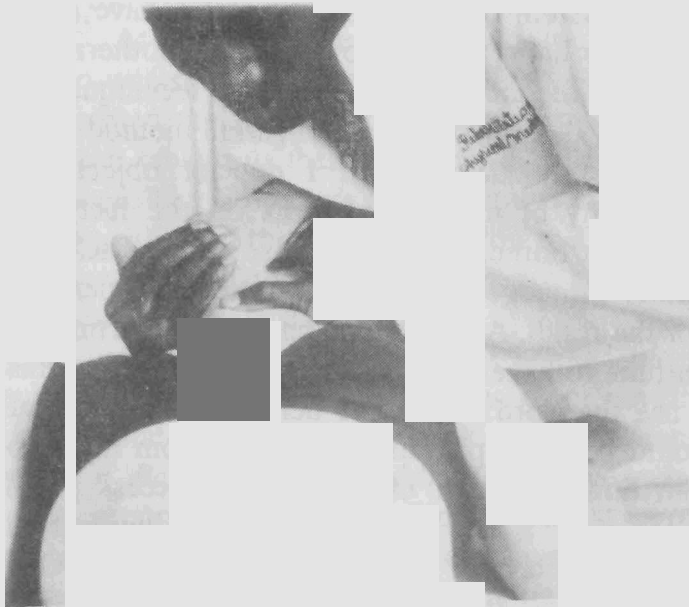


Fig. 1: Oscillatory rotation of the neck for unilaterally placed pain.

which I use on my patients. Figure 1 shows oscillatory rotation of the neck for unilaterally placed pain. Figure 2 I term vertical oscillatory pressure. It could be quite painful but it is very effective. Figure 3 is vertical thrust for the sacroiliac joint used mostly for women with sacroiliac lesions after childbirth.



Fig. 2: Vertical oscillatory pressure.

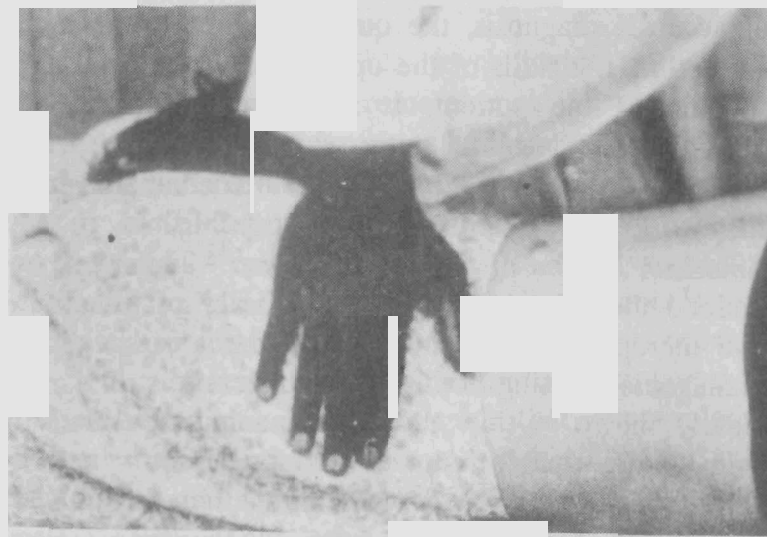


Fig. 3: Vertical thrust for the sacroiliac joint used mostly for women with sacroiliac lesions after childbirth.

There is no doubt that manipulative therapy is an effective form of treatment of back pain. The only reason for questioning the efficiency of the modality is the possibility that the differences between conventional treatment and manipulative therapy in terms of efficacy are not statistically significant. These include the studies of Hanraats in Holland,²⁸ Chrisman in the United States²⁹ and Edwards in Australia.³⁰ To put the problem into proper perspective, certain factors should be considered. In trying to design a protocol to study a problem of this nature many problems present themselves. Consensus on the parameters for assessment and the terminology to utilize vary from individual to individual. All clinicians do not have the same criteria for the assessment of pain which is the principal parameter concerned. Some of the variables which could confound results of investigations are problems of accurate diagnosis, the quality of pretreatment examination, the skills of the operator and the total personality of the patient. It is extremely difficult to design a double-blind study which would give valid results. However in 1982 a paper which emanated from the work done in Ife here was published in the *American Journal of Physical Medicine*.³¹ This work examined the relative therapeutic efficacy of manipulative therapy and conventional treatment in back pain management using stringent statistical tests. It was clearly shown in this study that manipulative therapy using Nwugarian techniques was superior to the conventional method. There were altogether 61 requests for reprints for this paper from 11 countries around the world.

The question arises: How does manipulative therapy achieve its effects? How it does this is still a subject of speculation. Probably, the reason for this is that there is still poor understanding of the nature of pain. The removal of pain represents the ultimate test of any modality. The pathophysiological process by which this is achieved needs to be understood.

In 1965 Melzack and Wall published what is now regarded as a classic paper.³² The gate control theory described in this paper offers an explanation of the neurophysiological phenomena surrounding pain mechanisms. To understand the mode of action of manipulation it may be necessary to appreciate the various combinations of functional reflexes, the disturbance of which gives rise to some bizarre symptoms. At the moment there is insufficient information to state with any certainty exactly why manipulation is an effective procedure.

In addition, the possible psychological effects of manipulation should be remembered. There are few modalities which have the advantages of laying of hands. Establishment of rapport with the patient, listening to his problems, handling him with gentle and caring hands could contribute to the ways that manipulation affects the pain under treatment. It may be concluded that the question of how pain is relieved by manipulation still remains only partially answered.

Finally it is sometimes said that manipulative therapy may be harmful. This is true of course but only when the rules are disregarded. I have treated 1,800 patients with manipulative therapy over 15 years in five different countries. Not once have I had to deal with untoward effects. We should not forget too quickly that

there are greater dangers associated with giving of injections, surgery, taking of drugs, dentistry and various other attempts aimed at improving the human condition. Manipulative therapy is an art based on scientific principles. It entails not brute force but a logical and persuasive skill. There is no doubt that it is a harmless and effective form of treatment when used by the right person for the appropriate case at the appropriate time.

PREVENTION OF BACK PAIN

How can back pain be prevented or at least its incidence in the population be reduced? In a paper published by the author in the *International Journal of Rehabilitation Research* in 1982 it was shown that an education program consisting of self-instruction and illustrated lectures can play a significant role in the prevention of back pain.³³

One must avoid lifting by bending the back itself. The back should be kept straight and rigid during this process. While the knees are bent, the object is finally lifted up by straightening the knees. During the acute phase of back pain, lifting should be avoided almost totally. In a lifting position, the lumbar spine can be likened to a cantilever. In a cantilever system the main horizontal strut is held by a tension support above it and a compression support beneath it. In a similar way the spine which acts like the strut is held by the extensor muscles and posterior ligaments which act as a tension system and below by the abdominal musculature which by raising intra-abdominal pressure acts as a compression system. The lumbo-sacral joint acts as the fulcrum of the spine.

Let us examine another illustration of the forces acting on the lumbar spine during the lifting process. To lift a 10 kg weight with knees bent and the back held straight the force exerted by the back muscles amounts to 140kg. The relationship between the levers (weight arm and force arm) is approximately 14:1. If the same 10kg is carried with arms outstretched the force exerted by the back muscles will be equal to 363kg. At this time it is believed that the force acting on the lumbosacral disc ranges from 282 to 726kg or even up to 1200kg, the latter value clearly exceeded the force required to smash the intervertebral discs (800kg is required in the young, 450kg in the aged).

In the sitting position one must make sure that the chair offers the correct support. The chair should have its back support practically upright. A pillow may be used to support the lumbar curve.

When lying down the support must be able to assume the shape of the subject's body contours. Ideally the bed must consist of a spring mattress on a slatted woodbase. Springs in a mattress should be watched consistently because of their tendency to sag.

The biomechanical approach to prevention is threefold: the application of ergonomics, training and pre-employment medical screening. Ergonomics is the study of people's posture at work. Ergonomics is potentially the most valuable approach because work can and should be designed to be safe and to suit the population engaged for it. Adverse handling stresses can be eliminated: the causes of postural backache can be removed, sometimes with a consequent gain in productivity, and vibratory stresses can be reduced.

Training for the recognition and avoidance of hazards in manual work, for the improvement of co-ordination and handling skill and for the development of an awareness of what can be handled without undue effort, or tolerated in terms of postural stress without stiffening, is potentially of great value. In Great Britain there is a legal requirement to provide training in the Health and Safety at Work Act of 1974.

Pre-employment screening is seldom used specifically for preventing back pain, but is generally a routine procedure in occupational medicine in Western countries. There are a few tests which may be of value in routine pre-employment screening either in the medical department or in the course of training. These include: tests of working capacity; tests of dynamic strength of trunk-flexor and of the trunk-extensors; and measurements of lumbar sagittal mobility. These are of value because deficiency in these tests is commoner in those with a previous history of back trouble. Moreover, a number of clinical tests are of value in predicting recurrence after the first attack and these include failure in the sit-up test and weakness or pain on resisted hip-flexion.

RECOMMENDATION

It is conventional that when a professor delivers his inaugural lecture, he makes recommendations to the audience. I have two concluding comments: one is a recommendation and the other is an advice.

In view of the prevalence of back pain in the population, the Federal Military Government should examine the possibility of instituting a Back Pain Research

Programme. This exists in various countries. Examples are Great Britain, the United States and Sweden. Industries in Nigeria should also make a contribution in this direction.

Over the last 20 years a lot has been learnt about back pain. Still a lot remains to be learnt. The major problem for the scientific community is still an explanation as to the aetiology of back pain, its genesis, the mode of action of manipulation and the scope of its application. The aetiology of disc disease is still not completely understood and the chain of events resulting in pain and incapacity is surmised rather than demonstrated. The intervertebral disc has been subjected to a number of morphological and chemical investigations but they have shed no light on the origin of pain: these investigations have, however, expanded our knowledge of the biological events in this avascular structure.

Recent research opportunities generated by the interest in and clinical use of dorsal column stimulation and acupuncture may help to improve the conceptual framework necessary to approach the problem of the treatment of pain but pain continues to be a poorly understood phenomenon. The presently available evidence indicates that we do not yet understand the cause or pathophysiology of many cases of back pain.

My advice is to my young academic colleagues. You do not need to have two heads to become a professor but there are some prerequisites: firstly, you must be prepared to work hard; secondly, your research work must have direction; and thirdly, pray for luck. Identify an area of research, pursue this area with great vigour so that at the end of the day you would have been seen

to have tried in providing answers to certain questions in that particular research area. In my own case, my focus in the research area is clear. Out of my nearly 50 publications about 35 are in the area of back pain. Someone once joked that it was about time I was considered for a chieftaincy title in Ife. My title should be *Ato ògóró èyìn* of Ife. Again to my junior colleagues I want to remind you about working hard. In my own example for instance, I joined the University in 1972 as a Graduate Assistant. I became a Professor eleven years later; the first black African to reach such a height in that field. And I am very proud to be an alumnus of this University. I will not pretend to be more brilliant than the next man but I am a hard worker and my work has direction. I have also had my own share of luck.

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