Surgically Treated Symptomatic Prolapsed Lumbar and Sacral Intervertebral Discs in Females: A Comparative Study of Incidence and Causative Factors and Treatment

M. O. N. Ibe

Department of Surgery, Central Medicare, Owerri, Imo State, Nigeria

ABSTRACT

Background and Objective: There are various postulated possible causes of surgically symptomatic prolapsed intervertebral discs in the lumbar and sacral regions. They may be acting singularly or collectively. Yet, these factors, which could vary in different environments, have not been satisfactorily confirmed. The intention of this study is to share the experience of the author in the occurrence, possible causative factors, and treatment of surgically symptomatic prolapsed lumbar and sacral intervertebral discs in females, and to compare this experience in Switzerland, Nigeria, and Jamaica using surgery records for a period of over 39 years. **Materials and Methods:** Records of these cases were examined and analyzed with the intent of comparing the frequency of occurrence and possible causative factors of this lesion in some countries. **Results:** There were 60 locations in 51 patients in Basel (Caucasian population only), 4 locations in 1 patient in Imo and Ebonyi States (African population only), and none in Jamaica (mixed population). The patients' ages ranged from 19 to 71 years in Switzerland, and the only patient in Nigeria was 49 years old. **Conclusion:** The study revealed that surgically treated symptomatic prolapsed lumbar and sacral intervertebral discs in females occurred more in Basel, Switzerland, than in Imo and Ebonyi States of Nigeria and none occurred in Jamaica, West Indies. Racial differences, certain sporting/recreational activities, smoking, and type of profession could have contributed to the development of this disease.

KEYWORDS: Females, possible causes, prolapsed discs

Address for correspondence:
Dr. M. O. N. Ibe,
Central Medicare, 43 Okigwe Road, Box 453, Owerri,
Imo State, Nigeria.
E-mail: snowwhyte_hosp@yahoo.com

Access this article online	
Quick Response Code:	**Website:** www.nigerianjsurg.com
	DOI: 10.4103/1117-6806.103104

INTRODUCTION

Sciatica is a relatively common condition with a lifetime incidence varying from 13 to 40%.[1] The corresponding annual incidence of an episode of sciatica ranges from 1 to 5%.[1] Intervertebral disc prolapse, protrusion, or extrusion account for less than 5% (though some reports put it between 5% and 10%) of all low back problems, but are the most common causes of nerve root pain and surgical interventions in the lumbar region.[2,3]

Prolapsed disc could be due to wear and tear from certain jobs that require constant sitting, such as driving, and recreational activities including rowing, skiing, weight lifting, jogging, walking, etc.[1,4,5] Genetics, body height, age, and smoking may also influence the development of this lesion.[1,4-13]

In the lumbar region, the clinical features of this disease include lower back pain (lumbago) and sometimes leg pains (radiation pains, sciatica), dysesthesia, pareses/paralyses, loss of urinary bladder and ano-rectal control. Plain radiographs of the spine, electromyograms (EMG), and Nerve Conduction Studies (NCS) could indicate this, but the diagnosis is usually confirmed through contrast myelography *vis-à-vis* cauda-equinography, Computerized Tomography scan (CT scan), which may need coronal and sagittal views/reconstructions, as well as axial or Magnetic Resonance Imaging (MRI).[14-20]

Treatment modalities include conservative measures with physiotherapy, rehabilitation, weight control, anti-inflammatory measures, epidural steroid injections, analgesia-assisted traction therapy (IVSAAT), lumbo-sacral back support, and stem cell therapy.[1,4,21-32]

Surgical measures include discectomy/microdiscectomy, fenestration, laminectomy with or without discectomy, artificial disc replacement, and nucleoplasty.[4,33-40]

The outcome of treatment depends on the location of the prolapse, clinical condition of the patient, and time of presentation and treatment.[41]

Management complications include worsening of pain and neurological status, dural tears, infections, nerve root injury, vascular injury, development of pseudo-aneurysms and arterio-venous fistulas, pulmonary embolism, retroperitoneal injuries, metabolic effects of steroids on the pituitary–adrenal axis, and epidural hematomas and abscesses.[1,3,22,31,42,43]

To be differentiated from this lesion are infections, abscesses, hematomas, tumors, aneurysms, arterio-veinous malformations, endometriosis, spinum bifidum occultum, osteophytes, and spondylolisthesis.[1,4,44-56]

We now try to compare the occurrence of surgically treated symptomatic prolapsed lumbar and sacral intervertebral discs in females in Switzerland, Nigeria, and Jamaica, with reference to some of these possibly influencing factors.

Objective

Using data on the occurrence, possible causative factors, and treatment of surgically symptomatic prolapsed lumbar and sacral intervertebral discs in females, this paper compared the experience in Switzerland, Nigeria, and Jamaica over a cumulative period of 39 years.

Materials and Methods

This study relied on the author's personal surgery records of patients who were treated in 60 locations (prolapses) in the lumbar and sacral regions in 51 females in Basel, Switzerland, for a period of about 3 years; four locations in one female in Imo and Ebonyi States, South East Nigeria, for a period of about 33 years; and none occurred in Jamaica, West Indies, for a period of about 3 years.

There was no selection of patients population-wise or socio-demographically. Also, there were no inclusion/exclusion criteria. Most of these cases were already diagnosed and referred by colleagues for surgery. The study did not find any indication or reason for non-surgical intervention.

The parameters looked into included the number of prolapsed discs and the number of treated patients. Both parameters were observed in three different countries – Jamaica, Switzerland, and Nigeria – over some number of years for each country. The relative frequency of occurrence for both the prolapses and treated patients was determined using the expression:

$$F_{d/p} = \frac{\text{No. of prolapses/Treated patients}}{\text{No. of years observed}} \times 100(\%)$$

The respective values of F_d (frequency of disease) and F_p (frequency of treated patients) are given in the last two columns of Table 4.

The incidence of occurrence and the possible causative factors of this lesion were also looked into.

Results

It was found that the patients' ages ranged from 19 to 71 years. The clinical features of the patients were those of lower back pains, radiating pains, impaired sensation, and pareses in the affected lower limb/s. There was, however, one emergency case due to acute loss of urinary bladder and ano-rectal control.

All lesions were confirmed through cauda-equinograms [Figure 1]. There was no adverse reaction to either of the contrasts used [Amipaque (metrizamide) or Lopamiro 300 (iodo/trometamol/edetate calcium disodium/hydrochloric acid)].

All the operations were done under general anesthesia in the knee-chest position (MECCA position) [Figure 2]. A midline skin incision (from the spinous process immediately above to that immediately below the process of the vertebrae squeezing out the nucleus pulposus) was made. The paraspinal muscles were separated from the spinous processes and laminae of the adjacent vertebrae on

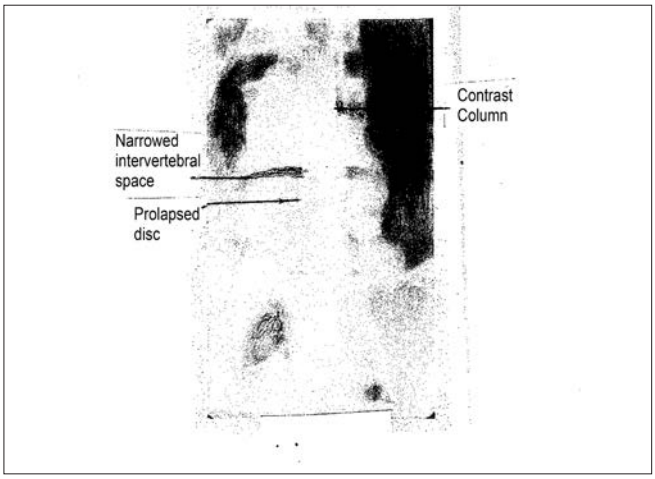

Figure 1: Cauda-equinogram

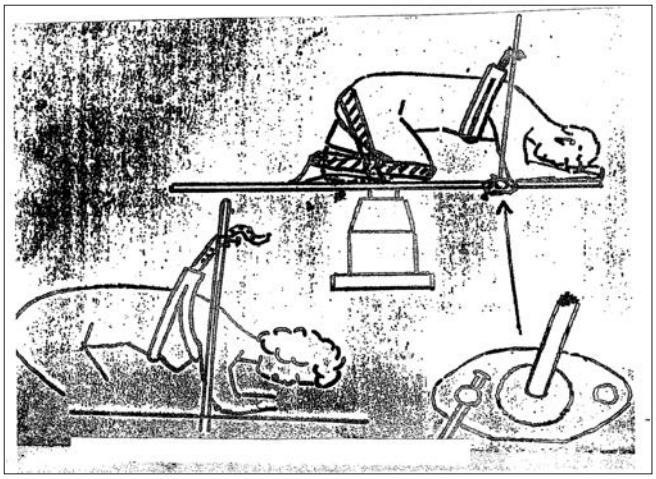

Figure 2: MECCA position - courtesy-Kantonsspital, Basel, Switzerland

Table 1: Symptomatic prolapsed intervertebral discs in females in Switzerland and Nigeria

Level	1–10 years	11–20 years	21–30 years	31–40 years	41–50 years	51–60 years	61–70 years	71–80 years	Total
Switzerland									
Th_{12}/L_1	-	-	-	-	-	-	-	-	-
$L_1/_2$	-	-	-	-	-	-	-	-	-
$L_2/_3$	-	-	-	-	-	-	-	-	-
$L_3/_4$	-	-	-		2	-	1	-	3
$L_4/_5$	-	1	3	9	8	4	4	1	30
L_5/S_1	-	-	1	10	13	1	2	-	27
S_1/S_2	-	-	-	-	-	-	-	-	-
Total	-	1	4	19	23	5	7	1	60
Nigeria									
$L_3/_4$	-	-	-	-	2	-	-	-	2
$L_4/_5$	-	-	-	-	2	-	-	-	2
Total	-	-	-	-	4	-	-	-	4

Table 2: Country, level and side

Level	Right side	Left side	Total
Switzerland			
Th_{12}/L_1	-	-	-
$L_1/_2$	-	-	-
$L_2/_3$	-	-	-
$L_3/_4$	2	1	3
$L_4/_5$	10	21	31
L_5/S_1	11	15	26
$S_1/_2$	-	-	-
Total	23	37	60
Nigeria			
$L_3/_4$	1	1	2
$L_4/_5$	1	1	2
Total	2	2	4

both sides. This wound was kept open with self-retaining retractors. From the adjacent laminae on same side of the lesion, the lower part of the upper lamina and the upper part of the lower lamina, together with the in-between yellow ligament, were nibbled off. This gave a clear view and adequate space to remove the pathological process and enucleate the nucleus pulposus totally, through an incision in the annulus fibrosus. This small incision was left open. The rest of the wound was closed in layers after satisfactory hemostasis and removal of the retractors, without any drains.

All patients were mobilized out of bed the next day postoperatively, though physiotherapy, by manual massage and passive and active movements of the lower limbs, was started as soon as they were returned to the ward.[57] The stitches were removed 9 days postoperatively. The patients were discharged home 2 days thereafter, but to return for follow-up checks about 7 days later. The cauda-equinograms revealed 60 prolapses in 51 patients in Switzerland and 4 prolapses in 1 patient in Nigeria.

In Switzerland, there were no prolapses at Th_{12}/L_1, $L_{1/2}$, $L_{2/3}$, and $S_{1/2}$; 3 at $L_3/_4$, 30 at $L_4/_5$, and 27 at L_5/S_1, totaling 60, while in Nigeria, there were 2 each at $L_3/_4$ and $L_4/_5$ [Table 1].

Table 2 shows two prolapses on the right and one on the left at $L_{3/4}$ in Switzerland and one on each side in Nigeria.

There were 10 prolapses on the right and 21 on the left at $L_{4/5}$ in Switzerland, and 1 on each side in Nigeria.

At L_5/S_1, there were 11 on the right and 15 on the left in Switzerland and none in Nigeria. In total, there were 23 prolapses on the right and 37 on the left in Switzerland and 2 on each side in Nigeria.

Table 3 shows that there were no prolapses in 1–10 years, 2 in 21–30 years, 7 in 31–40 years, 10 in 41–50 years, 2 in 51–60 years, 2 in 61–70 years, and 1 in 71–80 years age range on the right and none thereafter in Switzerland, whereas there were 2 in 41–50 years age range in Nigeria.

In Switzerland, there were no prolapses in 1–10 years, 1 in 11–20 years, 2 in 21–30 years, 12 in 31–40 years, 13 in 41–50 years, 3 in 51–60 years, 5 in 61–70 years age range on the left and none thereafter. There were two prolapses in 41–50 years age range in Nigeria.

The totals were: 1 prolapse in 11–20 years, 4 in 21–30 years, 19 in 31–40 years, 23 in 41–50 years, 5 in 51–60 years, 7 in 61–70 years, and 1 in 71–80 years age range in Switzerland, and 4 in 41–50 years age range in Nigeria.

The patients with bilateral lesions were: one at $L_3/_4$ (49 years), three at $L_4/_5$ (35 years, 49 years, and 49 years), one at L_5/S_1 (46 years), totaling five patients in Switzerland and one each at $L_3/_4$ and $L_4/_5$ in Nigeria.

Four patients had multiple lesions, viz. two at $L_3/_4$ and $L_4/_5$ (49 years, 65 years), two at $L_4/_5$ and L_5/S_1 (49 years, 61 years) in Switzerland, and one each at $L_3/_4$ and $L_4/_5$ in Nigeria.

One patient (49 years) had bilateral and multiple lesions at $L_3/_4$

Table 3: Country, side and age ranges in years

Side	1–10 years	11–20 years	21–30 years	31–40 years	41–50 years	51–60 years	61–70 years	71–80 years	Total
Switzerland									
Right	-	-	2	7	10	2	2	1	24
Left	-	1	2	12	13	3	5	-	36
Total	-	1	4	19	23	5	7	1	60
Nigeria									
Right	-	-	-	-	2	-	-	-	2
Left	-	-	-	-	2	-	-	-	2
Total	-	-	-	-	4	-	-	-	4

Table 4: Relative frequency of disc prolapses and treated patients

Country	No. of prolapses	No. of treated patients	Period observed in years	Relative frequency of prolapses F_d (%) in a year	Relative frequency of treated patients F_p (%) in a year
Jamaica	-	-	3	0	0
Switzerland	60	51	3	2000	1700
Nigeria	4	1	33	12.12	3

and $L_4/_5$, totaling four prolapses in Switzerland and the same in Nigeria.

In Table 4, it is seen that in Jamaica, the number of prolapses was zero and the number of patients treated was also zero over the 3-year period observed, with F_d (%) of zero in a year and F_p (%) of zero as well.

In Switzerland, the number of prolapses was 60 and the number of treated patients was 51 over the 3-year period observed, with F_d (%) of 2000 in a year and F_p (%) of 1700.

In Nigeria, the number of prolapses was 4 and the number of treated patients was 1 over the 33-year period observed, with F_d (%) of 12.12 and F_p (%) of 3 in a year, respectively.

All the patients tolerated the procedure very well and recovered from the anesthesia without any additional gross neurological deficits. There were no complications following surgery. The patients were followed up for up to 12 months postoperatively. Their wounds healed by primary intention, and their pains and previous neurological deficits had all resolved when last seen.

Discussion

Our findings showed that there were no prolapses up to the age of 18 years[58] and after the age of 71 years in both Switzerland and Nigeria.

The incidence of occurrence peaked at the age range 41–50 years in Switzerland and was the same in Nigeria. Before the age of 51 years, there were no prolapses at Th_{12}/L_1, $L_1/_2$, and $L_2/_3$ levels in both countries.

The majority of cases were at $L_4/_5$ in Switzerland, but were equal at $L_3/_4$ and $L_4/_5$ in Nigeria. There were more lesions on the left (37 to 23) in Switzerland, but were equal, with 2 on each side in Nigeria. The peaking for both sides was in 41–50 years age range in both countries. The bilateral lesions were mostly at $L_4/_5$ in 31–50 years age range in Switzerland, and were equal at $L_3/_4$ and $L_4/_5$ in 41–50 years age range in Nigeria.

The one emergency case was at L_5/S_1 bilaterally (46 years) in Switzerland, as a result of loss of urinary bladder and ano-rectal control.

The multiple lesions were 3 at $L_3/_4$ and $L_4/_5$ and 2 at $L_4/_5$ and L_5/S_1, all in 41–70 years age range, 3 being on the left side in Switzerland. In Nigeria, the multiple lesions were in one patient at $L_3/_4$ and $L_4/_5$ in 41–50 years age range and were equal on both sides. There were no lesions at L_5/S_1 in Nigeria.

Table 4 clearly indicates the predominant relative frequency of prolapses and relative frequency of treated patients in Switzerland (Caucasian population only) over those in Nigeria (African population only) and in Jamaica (mixed population). The only patient in Nigeria observed was after 33 years. Racial differences could have contributed to these observations.

Risk factors like genetics did not appear to be contributory, since this lesion did not occur in any twins or relations in our series, though there was a case at the tender age of 19 years in Switzerland.

Recreational activities like skiing might have played a role, since the Swiss, as observed by the author, liked/like this sport, which is practically absent in Nigeria and Jamaica. Skiing has a lot to do with movements in the lumbar and lumbo-sacral regions.

Physical activities associated with occupations like driving cause

exposure to vibration at around 4–5 Hz, which may coincide with resonant frequency of the spine in the seated position, and therefore lead to a direct mechanical effect on the lumbar disc.[1,58] By their standard of living, the Swiss owned more cars and did a lot more driving than Nigerians and/or Jamaicans, though statistical evidence is required to confirm this. However, with Nigeria's growing population and sophistication, especially in Imo and Ebonyi States, we might experience an upsurge in the occurrence of this disease in Nigeria through this factor.

Tobacco, from smoking, disturbs the metabolic balance of intervertebral discs. It induces coughing, thereby causing marked elevations of intra-disc pressures. There is the possibility of fibrinolytic effect of tobacco.[1,58] The Swiss, like other Caucasians, smoked/smoke a lot, while this habit is just beginning to grow in Nigeria and Jamaica.

The majority of herniated discs will heal themselves in about 6 weeks and do not require surgery.[4,58] However, the presence of neurological deficits requires one type of surgical intervention or the other, even if minimally invasive.

Cauda-equinograms are still very useful, especially where CT and/or MRI are not available or affordable.

The knee-chest position stretches the inter-spinous spaces and also keeps the intra-abdominal contents farther away from the operation site to avoid injuring them while the operation lasts.

Conclusion

From our personal experience, it was observed that surgically treated symptomatic prolapsed lumbar and sacral intervertebral discs in females occurred predominantly in Basel, Switzerland. Most cases were in 31–50 years age range in Switzerland, while it was 41–50 years in Nigeria. There were more prolapses on the left in Switzerland, but were equal on both sides and none at L_5/S_1 in Nigeria.

Racial differences, certain sporting/recreational activities, smoking, and type of profession could have contributed to the development of this disease in the lumbar and sacral regions.

Other risk factors, like environmental pollution and poor sanitation, as well as body height and age, together with the earlier mentioned ones, should be further closely looked into to reduce, if not completely eradicate, the occurrence of this seriously incapacitating disease, particularly in populations like Nigeria and Jamaica, where it is still not much known.

In view of the fact that the study is from the personal surgery records of the author, it is necessary to share the experience of others in this field so as to change the profile of this lesion, particularly in Switzerland, Nigeria, and Jamaica. Prospective studies should, therefore, be encouraged.

Though there are no data for comparison, we believe that surgical intervention should be carried out for most cases, if not all, with neurological deficit/s. Since we have had very good results, we strongly recommend the method of fenestration with total discectomy used by many neurosurgeons worldwide.

Acknowledgments

I am very grateful to my neurosurgical mentors, Prof. Andre Levy, Drs. Zdrojewsky and Dragoslav Sula, and my colleague, ItzakShaked, in the neurosurgical unit; Prof. Martin Algower, Chief, Department of Surgery, University of Basel Teaching Hospital (Kantonsspital), Basel, Switzerland, and other colleagues in this institution. I also thank Prof. Charles A. Attah, Provost, College of Health Sciences, Ebonyi State University, Abakaliki, Ebonyi State, Nigeria, for reviewing this paper. I am also grateful to the typist, my daughter, Mrs. Nkechi Stacy-Ann David, my wife, Lolo Jennifer Annette, for her love, advice, and support, and Prof. Patrick A. Okereke, Head, Department of Building, Imo State University, Owerri, Imo State, Nigeria, for his assistance in working out the statistics.

References

1. Stafford MA, Peng P, Hill DA. Sciatica: A review of history, epidemiology, pathogenesis, and the role of epidural steroid injection in management. Br J Anaesth 2007;99:461-73.
2. Manchikanti L, Derby R, Benyamin RM, Helm S, Hirsch JA. A systematic review of mechanical lumbar disc decompression with nucleoplasty. Pain Physician 2009;12:561-72.
3. Sangwan SS, Kundu ZS, Singh R, Kamboj P, Siwach RC, Aggarwal P. Lumbar disc excision through fenestration. Spine 2006;40:86-9.
4. Wikipedia, the free encyclopedia: Spinal disc herniation. [Oct 13, 2012].
5. Bernstein A, Webber O, Woledge R. An ergonomic comparison of rowing machine designs: Possible implications for safety. Br J Sports Med 2002;36:108-12.
6. Kawaguchi Y, Kanamori M, Ishihara H, Ohmori K, Matsui H, Kimura T. The association of lumbar disc disease with Vitamin-D receptor gene polymorphism. J Bone Joint Surg Am 2002;84:2022-8.
7. Heikkila JK, Koskenvuo M, Heliovaara M, Kurppre K, Riihimaki H, Heikkila K, *et al*. Genetic and environmental factors in sciatica. Evidence from a nationwide panel of 9365 adult twin pairs. Ann Med 1989;21:393-8.
8. Matsui H, Kanamori M, Ishihara H, Yudo K, Naruse Y, Tsuji H. Familial predisposition for lumbar degenerative disc disease. Spine (Phila Pa 1976) 1998;23:1029-34.
9. Simmons ED, Guntupalli M, Kowalski JM, Braun F, Seidel T. Familial predisposition for degenerative lumbar disc disease. Spine (Phila Pa 1976)1996;21:1527-9.
10. Varlotta GP, Brown MD, Kelsey JL, Golden AL. Familial predisposition for herniation of a lumbar disc in patients who are less than twenty one years old. J Bone Joint Surg Am 1991;73:124-8.
11. Heliovaara M. Body height, obesity and risk of herniated lumbar intervertebral disc. Spine (Phila Pa 1976)1987;12:469-72.
12. Frymoyer J: Lumbar disc disease: Epidemiology. Instr Course Lect 1992;41:217-23.
13. Porter SE, Hanley EN Jr. Themusculo-skeletal effects of smoking. J Am Acad Orthop Surg 2001;9:9-17.
14. Lunawat SK, Taneja DK, Malviya A. Correlation between MRI and intra-operative findings in prolapsed intervertebral disc. Indian J Orthop 2002;36:12.

15. Rahalkar MD, Sawlani V. Images: Gas in the spinal canal as sign of prolapsed intervertebral disc (PID) on plain CT. Indian J Radiol Imaging 2003;13:105-6.
16. Millette PC. Classification, diagnostic imaging and imaging characterization of a lumbar herniated disc. Radiol Clin North Am 2000;38:1267-91.
17. Ong A, Anderson J, Roche J. A pilot study of the prevalence of lumbar disc degeneration in elite athletes with lower back pain at the Sydney 2000 Olympic Games. Br J Sports Med 2003;37:263-6.
18. Luoma K, Vehmas T, Riihimaki H, Raininko R. Disc height and signal intensity of the nucleus pulposus on magnetic resonance imaging as indicators of lumbar disc degeneration. Spine (Phila Pa 1976) 2001;26:680-6.
19. Olmarker K, Rydevik B. Selective inhibition of tumor necrosis factor-alpha prevents nucleus pulposus-induced thrombus formation, intraneural oedema, and reduction of nerve conduction velocity. Spine (Phila Pa 1976) 2001;26:863-9.
20. Karppinen J, Paakko E, Paassilta P, Lohiniva J, Kurunlahti M, Tervonen O, *et al*. Radiologic phenotypes in lumbar MR Imaging for a gene defect in the COL9A3 GENE of type IX collagen. Radiology 2003;227:143-8.
21. Leung VY, Chan D, Cheung KM. Regeneration of intervertebral disc by mesenchymal stem cells: Potentials, limitations, and future direction. Eur Sine J 2006;15:S406-13.
22. Andreula CF, Simonetti L, de Santis F, Agati R, Ricci R, Leonardi M. Minimally invasive oxygen-ozone therapy for lumbar disc herniation. AJNR Am J Neuroradiol 2003;24:996-1000.
23. Iliakis E, Valadakis V, Vynios DH, Tisiganos CP, Agapitos E. Rationalization of the activity of medical ozone on intervertebral disc: A histological and biochemical study. Riv Neuroradiol 2001;14:23-30.
24. Bocci V. Oxygen-ozone therapy, a critical evaluation. Doordrecht: Kluwer Academic Publishers;2002. p. 300-2.
25. Andreula CF. Lumbosacral disc herniation and correlated degenerative disease: Spinal interventional chemodiscolysis with O_3. Riv Neuroradiol 2001;14:81-8.
26. Gallucci M, Limbucci N, Zugaro L, Barile A, Stavroulis E, Ricci A, *et al*. Sciatica: Treatment with intradiscal and intraforaminal injections of steroid and oxygen-ozone versus steroid only. Radiology 2007;242:907-13.
27. Teh J. Ostlere: Percutaneous spinal procedures. Imaging 2005;17:258-67.
28. Johnson BA. Therapeutic periradicular injections: It's a gas! AJNR Am J Neuroradiol 2005;26:988-9.
29. Bonetti M, Fontana A, Cotticelli B, Volta GD, Guindani M, Leonardi M. Intraforaminal O_2-O_3 versus periradicular steroidal infiltrations in lower back pain: Randomized controlled study. AJNR Am J Neuroradiol 2005;26:996-1000.
30. Madigan L, Vaccaro AR, Spector LR, Milam RA. Management of symptomatic lumbar degenerative disc disease. J Am Acad Orthop Surg 2009;17:102-11.
31. Moyer D. Chiropractic manipulation shown to cause herniated discs. Rebuild Your Back 2006.
32. Murata Y, Onda A, Ryvdevik B, Takahashi K, Olmarker K. Selective inhibition of tumor necrosis factor-alpha prevents nucleus pulposus-induced histologic changes in the dorsal root ganglion. Spine (Phila Pa 1976) 2004;29:2477-84.
33. Garg M, Kumar S. Interlaminar discectomy and selective foraminotomy in lumbar disc herniation. J Orthop Surg (Hong Kong) 2001;9:15-8.
34. Yeung AT. The evolution of percutaneous spinal endoscopy and discectomy: State of the art. Mt Sinai J Med 2000;67:327-32.
35. Agarwal S, Bhagwat AS. HoYag laser-assisted lumbar disc decompression: A minimally invasive procedure under local anaesthesia. Neurol India 2003;51:35-8.
36. Gibson JN, Grant IC, Waddell G. Surgery of lumbar disc prolapse. Cochrane Database Syst Rev 2000:CD001350.
37. Livesey JP. Laser discectomy versus lumbar epidural stroid injections: A randomized comparative study of two treatments for sciatica. JBJS (Br.) 2000;82:74.
38. Knight M, Goswami A. Lumbar percutaneous KTP532 wavelength laser disc decompression and disc ablation in the management of discogenic pain. J Clin Laser Med Surg 2002;20:9-13.
39. Boult M, Fraser RD, Jones N, Osti O, Dohrmann P, Donnelly P, *et al*. Perctaneous endoscopic laser discectomy. Aust N Z J Surg 2000;70:475-9.
40. Barbara M, Knop J, James FZ, Ken YH, Bradford D. Anatomic position of a herniated nucleus pulposus predicts the outcome of lumbar discectomy. J Spinal Disord 1996;9:246-50.
41. Papadoulas S, Konstantinou D, Kourea HP, Kritikos N, Haftouras N, Tsolakis JA. Vascular injury complicating lumbar disc surgery. Systematic review. Eur J Vasc Endovasc Surg 2002;24:189-95.
42. Solonen KA. Arteriovenous fistula as a complication of operation for prolapsed disc. Acta Orthop Scand 1964;34:159-66.
43. Atlas SJ, Keller RB, Chang Y, Deyo RA, Singer DE. Surgical and non surgical management of sciatica secondary to lumbar disc herniation. Spine (Phila Pa 1976) 2001;26:1179-87
44. Bickels J, Kahanovitz N, Rubert CK, Henshaw RM, Moss DP, Meller I, *et al*. Extraspinal bone and soft- tissue tumors as a cause of sciatica. Clinical diagnosis and recommendations: Analysis of 32 cases. Spine (Phila Pa 1976) 1999;24:1611-6.
45. Bodack MP, Cole JC, Nagler W. Sciatic neuropathy secondary to a uterine fibroid: A case report. Am J Phys Med Rehabil 1999;78:157-9.
46. Chen WS. Chronic sciatica caused by tuberculous sacroiliitis. Spine (Phila Pa 1976) 1995;20:1194-6.
47. Dhote R, Tudoret L, Bachmeyer C, Legmann P, Christoforov B. Cyclic sciatica. A manifestation of compression of the sciatic nerve by endometriosis. Spine (Phila Pa 1976) 1996;19:2277-9.
48. Hammer A, Knight I, Agarwal A. Localized venous plexi in the spine simulating prolapse of an intervertebral disc; a report of six cases. Spine (Phila Pa 1976) 2003;28:E5-12.
49. Hermier M, Cotton F, Saint-Pierre G, Jouvet A, Ongolo-Zogo P, Fischer G, *et al*. Myelopathy and sciatica induced by an extradural S1 root haemangeoblastoma. Neuroradiology 2002;44:494-8.
50. Kumar B, Sriram KG, George C. Osteophyte at the sacro-iliac joint as a cause of sciatica: A report of four cases. J Orthop Surg (Hong Kong) 2002;10:73-6.
51. Papapietro N, Gulino G, Zobel BB, Di Martino A, Denaro V. Cyclic sciatica related to an extrapelvic endometriosis of the sciatic nerve: New concepts in surgical therapy. J Spinal Disord Tech 2002;15:436-9.
52. Phillips JM, Stedeford JC, Hartsilver E, Roberts C. Epidural abscess complicating insertion of epidural catheters. Br J Anaesth 2002;89:778-82.
53. Stirling A, Worthington T, Rafiq M, Lambert PA, Elliott TS. Association between sciatica and proprionibacterium acnes. Lancet 2001;357:2024-5.
54. Thomas E, Abiad L, Cyteval C, Gallix B, Taourel P, Bruel JM, *et al*. Metastatic pudendal nerve compression presenting as atypical sciatica. J Spinal Disord Tech 2002;15:324-5.
55. Yurtseven T, Zileli M, Goker EN, Taumergen E, Hoscoskun C, Parildar M. Gluteal artery pseudoaneyrysm, a rare cause of sciatica pain: A case report and literature review. J Spinal Disord

Tech 2002;15:330-3.

56. Ibe MO. Spinal subdural extramedullary neurinoma mimicking a prolapsed intervertebral disc. Case report. Ebonyi medical journal 2009;8.
57. Filiz M, Cakmak A, Ozcan E. The effectiveness of exercise programmes after lumbar disc surgery: A randomized controlled study. Clin Rehabil 2005;19:4-11.
58. Ibe MO. Comparative studies of the incidence of surgically treated symptomatic prolapsed lumbar and sacral intervertebral discs in males in Basel (Switzerland), Jamaica (West Indies) and Imo and Ebonyi States (South East Nigeria). NJS 2011;17:19-24.

How to cite this article: Ibe M. Surgically Treated Symptomatic Prolapsed Lumbar and Sacral Intervertebral Discs in Females: A Comparative Study of Incidence and Causative Factors and Treatment. Niger J Surg 2012;18:61-7.

Source of Support: Nil. **Conflict of Interest:** None declared.