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Histopathological and histochemical patterns of soft tissue sarcomas in Ilorin, Nigeria

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Summary
This research was carried out on soft tissue sarcomas processed in the Department of Pathology of University of Ilorin Teaching Hospital over a period of 18 years (1979-1996).Tumours in which pathognomonic features necessary for diagnosis were present on haematoxylin and eosin sections were diagnosed accordingly while special stains were employed to highlight characteristic features of some other tumours. Also a panel of special stains was performed on the poorly differentiated tumours. The three commonest tumours were fibrosarcoma, rhabdomyosarcoma and liposarcoma in decreasing order of frequency. Fibrosarcoma and leiomyosarcoma were commonest in middle age while rhabdomyosarcoma was commonest in childhood and early adult life. There was a male preponderance of the tumours with a male to female ratio of 1.3:1. With the use of special stains, typical diagnostic histological characteristics were found in 3 out of the 13 tumours initially diagnosed as poorly differentiated thereby reducing their number to 10. Plans are underway to do immunohistochemical studies and chromosomal analysis on the tumours through collaborative studies.

Keywords: *Histochemistry, soft tissue, sarcomas.*

Résumé
Cette étude était faite sur les tissues douce de sarcome au département de pathologie du Centre Hospitalier Universitaire de l'universite d' Ibadan, Nigéria durant une période de 18 ans (1989-1996). Les tumeurs ayant les characterisques pathognomoniques nécessaire pour diagnostiquer la presence des sections de l'hematoxyline et de l' eosine étaient diiagnostiques proprement. Les teintures speciales étaient employés pour illuminés les signes charactéristiques sur certains tumeurs. Ainsi une série de teinture spéciales était performé pour differencier les faible tumeurs. Les 3 cas de tumeurs plus commun étaient fibrosarcome ,rhabdomyosarcome et liposarcome en ordre de fréquence decroissante. La fibrosarcome et liposarcome étaient plus commun chez les ages moyen alorsque la rabdosarcome était commun en enfance et début de vie adulte. Il y avait une preponderance des tumeurs chez les males avec une proportion de male:femele de 1.3:1. Avec l'emploi des teintures spéciales, les charactéristiques de diagnostie histologiques étaient chez 3 des 13 tumeurs initialement mal-diagnostiqués ainsi réduisant le nombre a 10. Les arrangements sont en cours pour faire des études immunohistochemiques et d' analyses chromosomales sur les tumeurs a travers des recherches en collaboration.

Introduction
Histopathological diagnosis in our environment is limited mainly to light microscopy occasionally supported with histochemical studies (special stains) in few centres. The precise and accurate diagnosis of anaplastic tumours is very difficult without electron microscopy and/or immunohistochemistry. Accurate histopathological diagnosis and classification contribute significantly to establishing epidemiological patterns and prognosis of sarcomas while wrong diagnosis would lead to treatment failure. As efforts are being made to reduce infectious/communicable diseases, there has been an apparent relative rise in the occurrence of cancers, especially those of soft tissues, and the need for appropriate histopathological typing cannot be overemphasised.

This research was carried out to study the histopathological pattern of soft tissue sarcomas and "special stains" were done on the poorly differentiated tumours. At present, we encounter more soft tissue sarcomas than what our experience was few years back, and a good number of the cases are anaplastic. The need for accurate histopathological diagnosis has therefore become absolutely imperative. Recent diagnostic techniques such as immunohistochemistry, cytogenetic and molecular genetic studies are virtually impossible in our setting because of lack of facilities and equipment. The intention therefore is to continue this study through collaborative research.

Materials and methods
This research is a retrospective study of cases of soft tissue sarcomas reported in the Department of Pathology of University of Ilorin Teaching Hospital (UITH) Ilorin from January 1979 to December 1996. Vital data such as age, sex and site of lesions were extracted from the departmental histopathology register and request forms. The various histopathological diagnoses were reviewed from the request forms, duplicate copies of reports and slides. Some of the slides were remounted while in other cases, fresh sections were cut from the original paraffin blocks. Lesions wherein sufficient features were present for histopathological diagnosis from haematoxylin and eosin (H. & E.) staining were diagnosed and classified accordingly. In others, histochemical studies were done for further characterization and classification. These histochemical studies included reticulin for fibrosarcoma and alveolar soft part sarcoma, phosphotungstic acid haematoxylin (PTAH) for rhabdomyosarcoma and Periodic Acid Schiff (PAS) for alveolar soft part sarcoma.

Results
A total of 148 cases of soft tissue sarcomas were found. Eighty four (56.8%) occurred in males while 64(43.2%) occurred in females giving a male to female ratio of 1.3:1 (Table 1). Fibrosarcoma was the most preponderant lesion. There were 49 cases constituting 33.1%. It was followed by rhabdomyosarcoma (Fig. 1) with 28 cases or 19% and liposarcoma with 20 cases or 13.5%. The 28 cases of rhabdomyosarcoma were made up of 18 cases of pleomorphic, 8 of embryonal and 2 cases of alveolar rhabdomyosarcoma. Twelve cases of Kaposi's sarcoma and 11 of angiosarcoma were found.

Initially 13 cases were reported as poorly differentiated soft tissue sarcomas. The panel of histochemical techniques

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revealed sufficient features of rhabdomyosarcoma in 2 and alveolar soft part sarcoma (Fig. 2) in 1 of the 13 cases thereby bringing the number of poorly differentiated soft tissue sarcomas to 10. There were 8 cases of leiomyosarcoma. All the 6 cases of malignant fibrous histiocytoma found occurred in females just as it was the situation with the only case of malignant schwannoma (Fig.3). A case each of synovial sarcoma was found in each sex.

Table 1: Histological types and sex incidence of soft tissue Sarcomas

	Male		Female			
Type of Sarcoma	Number of cases	%	Number of cases	%	Total	%
Fibrosarcoma	28	18.9	21	14.2	49	33.1
Rhabdomyosarcoma	18	12.2	10	6.8	28	19.0
Liposarcoma	13	8.8	7	4.7	20	13.5
Kaposi's sarcoma	9	6.1	3	2.0	12	8.1
Angiosarcoma	8	5.4	3	2.0	11	7.4
Poorly differentiated soft tissue sarcoma	3	2.0	7	4.7	10	6.7
Leiomyosarcoma	3	2.0	5	3.4	8	5.4
Malignant fibrous histiocytoma			6	4.0	6	4.0
Synovial sarcoma	1	0.7	1	0.7	2	1.4
Schwannona			1	0.7	1	0.7
Alveolar soft part sarcoma	1	0.7			1	0.7
TOTAL	84	56.8	64	43.2	148	100.0

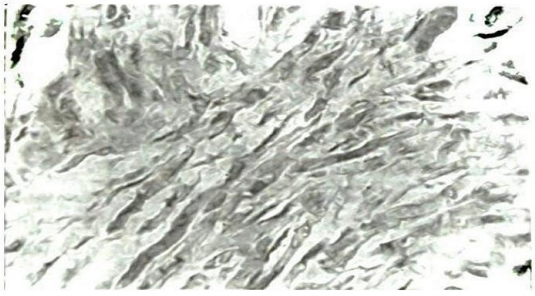

Fig. 1: Rhabdomyosarcoma
Rhabdomyblast with "tadpole" and "strap" configuration are present (H&E x 640)

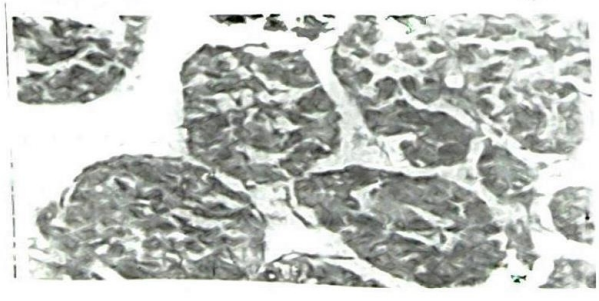

Fig. 2: Alveolar soft part sarcoma
Tumour cells show characteristic "organoid" arrangement and intimate association with thin-walled sinusoidal blood vessels (H & E 640)

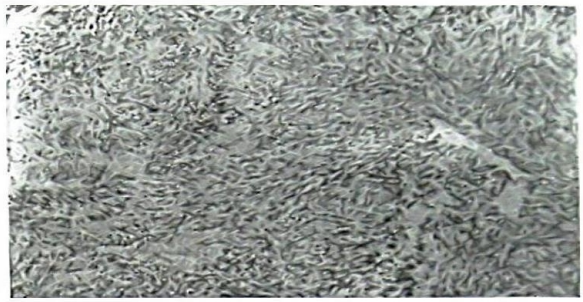

Fig. 3: Schwannoma
Section showing compact mass of Antoni A tissue with nuclear palisades and looser Antoni B tissue. The circumscribed masses of Antoni A are "Verocay bodies" (H & E 160)

Special stains were done and these included reticulin for fibrosarcoma (Fig. 4). In 2 of the 3 cases initially diagnosed as poorly differentiated soft tissue sarcomas, PTAH demonstrated cross-striations (Fig. 5) and were thus reclassified as rhabdomyosarcoma. In the third case, H & E showed organoid arrangement of tumour cells (Fig. 2), which was further demonstrated by reticulin stain (Fig. 6). Using the PAS technique, the presence of PAS positive intracytoplasmic material was demonstrated and the tumour was subsequently reclassified as alveolar soft part sarcoma.

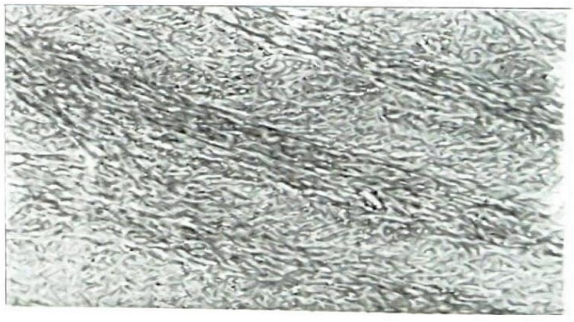

Fig. 4: Fibrosarcoma
Highly cellular tumour with spindle-shaped cells growing in a "herringbone" fashion (Reticulin x 160)

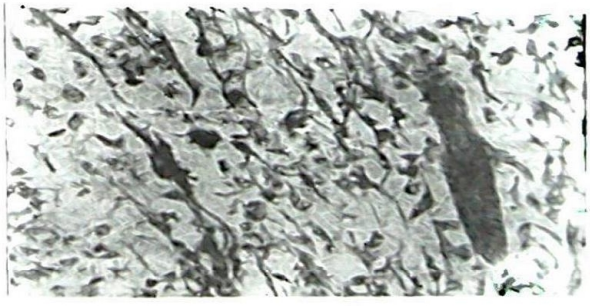

Fig. 5: Rhabdomyosarcoma
Cross-striations and peripheral beading are present in tumour cells (PTAH x 640)

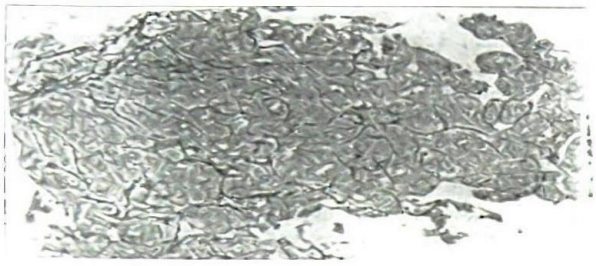

Fig. 6: Alveolar soft part sarcoma
"Organoid" cell grouping and sinusoidal blood vessels are outlined by reticulin fibres. (Reticulin x 160)

There was higher frequency of leiomyosarcoma and poorly differentiated soft tissue sarcoma in females than males. Tumours such as fibrosarcoma, liposarcoma and leiomyosarcoma were commoner in the middle-aged and elderly while rhabdomyosarcoma, Kaposi's sarcoma and angiosarcoma were commoner in childhood and early adult life. The only case of schwannoma occurred in a 58-year-old woman (Table 2).

Discussion

Extensive review and histochemical studies were carried out on the soft tissue sarcomas (exclusive of viscera and breast) that were reported in the Department of Pathology of University of Ilorin Teaching Hospital within a period of 18 years (1979-1996). Our experience at the surgical cut-up bench and reports from other tertiary health institutions suggest that there is a rising frequency of soft tissue sarcomas in Nigeria although researches and epidemiological data on these tumours are sparse. This apparent increase may be due to a relative decline in the nonneoplastic diseases or due to greater awareness such that more patients now present in the hospital than before. Because the tumours are slow-growing and may be asymptomatic initially, many patients come at late stages when some of the cancers have become anaplastic and diagnosis by light microscopy of haematoxylin and eosin (H & E) section virtually inaccurate.

In this review of 148 cases in Ilorin, Nigeria fibrosarcoma was the commonest followed by rhabdomyosarcoma, liposarcoma and Kaposi's sarcomas. Many reviews have reported changing patterns of soft tissue sarcomas. In a study on fibrosarcoma by Stout [1], it was noted that as more data become available on the types and patterns of somatic sarcomas, lesions that were once classified as fibrosarcoma are now recognised as belonging to other categories. Classification of any lesion depends on careful sampling of the tissue to establish the type of tumour and the degree of cellular differentiation. In a review of somatic soft tissue sarcomas by Pritchard *et al* [2], 12% were classified as fibrosarcoma as compared to 21% for liposarcoma and 19% for all types of rhabdomyosarcoma. Other studies in Caucasians have also reported changing patterns. Werd *et al* [3] reported liposarcoma as second in frequency to malignant fibrous histiocytoma just as Singh *et al* [4] reported malignant fibrous histiocytoma as the most common soft tissue sarcoma in adults. It has however been said that malignant fibrous histiocytoma is a controversial sarcoma and a misinterpretation of other types of sarcomas [5]. Many recent studies have reported liposarcoma as one of the most common sarcomas [6,7].

In a study of the clinical presentation and management of soft tissue sarcomas by Sone [8] in Yaounde, Cameroon the pattern of sarcomas was rhabdomyosarcoma 19.2%, fibrosarcoma 19%, liposarcoma 18.2% and malignant fibrous his-

Table 2: Age incidence of soft tissue sarcoma

Age (yrs)	Fibro sarcoma	Rhabdomyo sarcoma	Lipo sarcoma	Kaposi's sarcoma	Angio sarcoma	Poorly Differentiated soft tissue sarcoma	Leiomyo sarcoma	Malignant fibrous histiocytoma	Synovial sarcoma	Schwannoma	Alveolar soft part sarcoma	Total	%
0 – 9	1	6	3			1	1					12	8.1
10 – 19	3	6		5	2	3		1				20	13.5
20 – 29	3	5	2		3			1	1			15	10.1
30 – 39	12	4	1		1	2	1	2				23	15.5
40 – 49	12	3	2	2	2		2					23	
50 – 59	7		1	3	1	2	2	1	1	1	1	20	13.5
60 – 69	4	2	4	1		1	2					14	9.5
70 – 79	1		3			1		1				6	4.1
80 – 89					1							1	0.7
Age Unspecified	6	2	4	1	1							14	9.5
TOTAL	49	28	20	12	11	10	8	6	2	1	1	148	100.0

The anatomical distribution of the tumours is shown in Table 3. Over 40% occurred in the lower limbs with more than 13% of all lesions put together occurring in the thigh alone. Lesions in the trunk accounted for 35.8%, 12.8% in the head and neck region while the remaining 10.8% occurred in the upper limbs.

Table 3: Distribution of soft tissue sarcomas according to site.

Site	No. of Cases	Percentage
Lower limbs	60	40.6
Trunk	53	35.8
Head and Neck	19	12.6
Upper limbs	16	19.8
Total	148	100.0

tiocytoma 10.5%. Our own study revealed that fibrosarcoma constituted 33.1%, rhabdomyosarcoma 19% and liposarcoma 13.5%. There have been reports from Nigeria on Kaposi's sarcoma by Oluwasanmi and Osunkoya [9], leiomyosarcoma of the penis by Nkposong and Osunkoya [10], both from Ibadan, and an unusual presentation of urogenital rhabdomyosarcoma (sarcoma botryoides) from Ilorin by Adetiloye and Anjorin [11]. Leiomyosarcoma is said to account for approximately 7% of soft tissue sarcomas in Caucasians [12] a figure that is slightly higher than the 5.4% found in our own study.

The varying incidence patterns notwithstanding, it is clear from the various studies that the leading soft tissue sarcomas in blacks are fibrosarcoma, rhabdomyosarcoma and liposarcoma. Accuracy on the proportion of each tumour will depend on the facilities available to individual researcher. In a study of 100 cases. Suit *et al* [13] noted that the diagnosis of an individual tumour may be uncertain because several histopathological patterns may be present. This we have also experienced in our own practice here in Ilorin. Accordingly, the final histopathological diagnosis is, to some extent, dependent on the amount of tissue studied and the histopathologists judgement of the dominant features. Furthermore, for certain tumour types, there are no widely understood, clearly defined and easily applied diagnostic criteria [13]. In the present study we were able to do histochemical studies which yielded useful results in selected cases. It is common knowledge that accuracy in diagnosis and classification will depend largely on the facilities available to the individual researcher.

A lot of information remains untapped on the H & E sections. Through the use of immunocytochemical procedures, antibodies of predetermined specificities, rather than dyes, could be applied to sections [14]. Furthermore monoclonal antibody technology has permitted the development of highly specific probes that can be used with these sensitive assays on standard histopathological material [15]. "Armed with these antibodies and techniques, the pathologist can make important discriminations between different tumours, the histologic appearances of which may be quite similar [16]. Immunohistochemical assessment of tumour suppressor gene and oncogene products may give insight into pathogenetic mechanisms and diagnoses of tumours. Although some researchers initially thought that such products do not appear to correlate reliably with clinical outcome [17], more recently, studies on alveolar rhabdomyosarcoma [18], and synovial sarcoma [19,20], show correlation between prognosis and expression of specific fusion oncongenes.

Chromosomal analysis of solid tumours is becoming an increasingly useful tool to help establish a correct diagnosis and provide prognostically important information. Characteristic karyotypic patterns in terms of degree of cytogenetic complexity and type of nonrandom abnormalities may help to distinguish neoplasia from a nonneoplastic lesion [21]. Molecular assays for specific gene fusions provide a genetic approach to the differential diagnosis of soft tissue sarcomas. The genetic categories correspond closely to the standard histopathologic categories [22]. Presence of a specific or pathognomonic change may confirm or refute a suspected diagnosis, provide an alternative unsuspected diagnosis and trace the origin of a metastasis. All these newer techniques in the diagnosis of soft tissue sarcomas are not available in our centre, just like other tertiary health institutions in most developing countries.

In conclusion, this is the first report of research on soft tissue sarcomas recently started in the Department of Pathology of University of Ilorin Teaching Hospital, Ilorin, Nigeria. It is a retrospective study on the archival materials in our department which is intended to pave the way for prospective studies. Plans are at advanced stage to continue this research through collaboration with researchers in centre where facilities for immunohistochemical and cytogenetic studies are available.

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