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Histopathological Study of Soft Tissue Tumours (Three Years Study)

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Abstract: ***Background: Soft tissue tumors are defined as mesenchymal proliferations which occur in the extraskeletal non-epithelial tissues of the body, excluding the viscera, coverings of brain and lymphoreticular system. The main objective of this study was to study the histopathological features of soft tissue tumors and to study the occurrence of soft tissue tumors in relation to age, sex and anatomical site. Methodology & Results: This study comprised a period of 3 years from September 2004 to August 2007. Soft tissue tumors accounted for 1.65% of all surgical specimens and 9.64% of all tumors received in our Department. In this study a total of 137 cases of soft tissue tumors were studied. There were 113 benign soft tissue tumors (82.48%) and 24 malignant soft tissue tumors (17.52%). The benign to malignant ratio was 4.70:1. The soft tissue tumors were more common in males comprising 72 cases (52.55%) as compared to females 65 cases (47.44%) with a male-female ratio of 1.10:1.Majority of benign tumors were located in head and neck region (34 cases, 30%), and soft tissue sarcomas showed a predilection for lower extremities (18 cases – 75%). The benign soft tissue tumors occurred over a wide range of distribution with peak incidence in the fourth decade of life (27 cases – 23.89%) & were more common in males – 60 cases (53.09%). Malignant soft tissue tumors occurred with an equal frequency in both male and female patients accounting for 12 cases each. The most common benign soft tissue tumors was adipose tissue tumor (52 cases – 46.01%) followed by vascular tumors (20 cases – 17.69%), fibrous tumors (18 cases – 15.92%), peripheral nerve sheath tumors (8 cases – 7.%), synovial tumors (5 cases – 4.4%), fibrohistiocytic tumors (4 cases – 3.5%), smooth muscle tumors (3 cases – 2.65%). In soft tissue sarcomas, malignant fibrous histiocytic tumors were the commonest tumors (5 cases – 20.83%), followed by PNET and related lesions (4 cases – 16.66%). These were followed by adipose tissue and perivascular tumors (3 cases each – 12.5%), and fibrous and vascular tumours (2cases– 8.3%).Majority of soft tissue sarcomas were grade-2 accounting for 10 cases (43.47%) Conclusion: A good clinical acumen, thorough description and grossing of specimens, and light microscopic evaluation of hematoxylin and eosin stained sections are fundamental aspects in the diagnosis of soft tissue tumors. Majority of soft tissue tumors can be diagnosed by hematoxylin and eosin stained sections, supplemented by special stains and immunohistochemistry, yet the foundation of these newer techniques rests upon the diagnosis made on light microscopic evaluation of hematoxylin and eosin stained sections.***

Keywords: Soft tissue tumors; Benign tumors; Malignant tumors; Enzinger & Weiss; FNCLCC, AFIP, MPNST, PNET, MFH, Grading, Staging

1. Introduction

Soft tissue can be defined as non-epithelial, extraskeletal tissues of the body exclusive of reticulo-endothelial system, glia and supporting tissues of various parenchymal organs. It is represented by voluntary muscles, fat and fibrous tissue, along with the vessels serving these tissues. By convention, it also includes peripheral nervous system[1].

Soft tissue tumors are defined as mesenchymal proliferations which occur in the extraskeletal non-epithelial tissues of the body, excluding the viscera, coverings of brain and lymphoreticular system[2]. The annual incidence of soft tissue tumor is 1.4 per 100000 population[3]. Soft tissue tumors are the fourth most common malignancy in children, after hematopoietic neoplasm, neural tumor and Wilms tumor[2]. Soft tissue sarcomas account for 15% of all childhood cancers[2]. Benign tumors outnumber malignant ones by margin of 100:1[1].

The degree of differentiation is a reliable indicator of future behaviour but sometimes differentiation is misleading, certain leomyosarcomas may metastasize widely despite of their relative high degree of differentiation, fibrosarcomas on the other hand tends to persue a less aggressive clinical course that one would expect from their immature histological appearance and sarcomas arising in DFSP has increased metastases risk [3, 4, 5]. Histologic grade represents the most important prognostic factor for all soft tissue sarcomas, strongly associated with the advent of metastasis and patients survival [2, 6].

The use of ancillary techniques like immunohistochemistry, electron microscopy flow cytometry and cytogenetics, has increased insight into the tumor biology and has provided tools for greater diagnostic accuracy. Yet the foundation of these newer techniques rests upon the histologic diagnosis made on light microscopic evaluation of hematoxylin and eosin stained sections and use of special stains. It is critical to recognize immunohistochemistry as an adjunctive technique, which does not supercede or replace the traditional morphologic diagnosis[7]. Soft tissue masses present a challenge to the pathologist because of their extremely varied morphology and biologic behaviour[8].

Need for the Study

It is difficult to study the occurrence of soft tissue tumors in relation to age, sex, site and the frequency of benign to malignant tumor is nearly impossible to determine accurately[1]. This has promoted me to undertake the present study.

2. Objectives

1. To study the occurrence of soft tissue tumors in relation to age, sex and anatomical site.

2. To study histopathological features of soft tissue tumors.
3. To study frequency of occurrence of benign and malignant soft tissue tumors.
4. To study soft tissue sarcomas based on degree of cellularity, cellular pleomorphism, mitotic activity, degree of necrosis, invasive growth, hemorrhage, inflammatory infiltrate (Broder et al, 1939). To grade soft tissue sarcomas by Federation Nationale des Centres de Lutte Contre Le Cancer (FNC LCC) System (Trojani et al, 1984).

3. Review of Literature

Virchow proposed connective tissue as the origin of all soft tissue tumors in 1858[1].
Stout was the first investigator to provide a detailed description of tumors of soft tissues[9].
Systemic clinical study of soft tissue tumors were primarily initiated by Pack and his colleagues[10].

The annual incidence of benign soft tissue tumors is 300 per 100000 and that of sarcoma is 1.4 per 100000 population[1]. Incidence of soft tissue tumors varies depending on age and sex of patient. Soft tissue Sarcoma is more common in men[11]
Classification of Soft Tissue Tumors: The first classification of soft tissue tumors was given by Rokitansky in 1842[1]. Wilkis in 1859, proposed a classification based on cellular and fibrous components of tumors[1]. Brost in 1902 classified soft tissue tumors based on histogenesis and structure[2]. Stout in 1953 proposed classification of tumors based on histogenesis, morphology and behavior[9].

Classification of soft tissue tumors by Armed Forces Institute of Pathology

(AFIP) [12] in 1957, 1967 and 1983. WHO in 1969 proposed classification of soft tissue tumors based on review of more than 500 soft tissue tumors, which was later on revised in 1994[13].

The classification followed in this study is "Histologic classification of soft tissue tumors" given in Enzinger and Weiss's soft tissue tumor, 4th Edition, Chapter-1, page No. 7. This classification is similar but not identical to the 1994 WHO classification[1].

Federation Nationale des Centres de Lutte Contre le Cancer (FNCLCC) System[13, 14]:

In 1984 Trojani et al[15] presented FNCLCC system of grading soft tissue sarcoma based on analysis of 155 adult patients. So far FNCLCC system is the best documented and tested system[1]. So this FNCLCC system of grading soft tissue sarcomas is being followed in this present study.

Definitions of Grading Parameters for FNCLCC System[1, 15]

	Parameter	*Criterion*
1.	Tumor differentiation	
	Score-1	Sarcoma closely resembling normal adult mesenchymal tissue (e.g., well differentiated liposarcoma)
	Score-2	Sarcoma for which the histologic typing is certain (e.g., alveolar soft part sarcoma)
	Score-3	Embryonal and undifferentiated sarcomas.
2.	Mitosis Count	
	Score-1	0-9/ 10 HPF
	Score-2	10-19 / 10 HPF
	Score-3	≥20/10 HPF
3.	Tumor necrosis (microscopic)	
	Score-0	No necrosis
	Score-1	≤ 50% tumor necrosis
	Score_2	>50% tumor necrosis
4.	Histologic grade	
	Grade-1	Total score 2, 3
	Grade-2	Total score 4, 5
	Grade-3	Total score 6, 7, 8

4. Methodology and Results

The present study is done by examining surgically removed soft tissue specimens submitted in the Department of Pathology, M.R. Medical College, Gulbarga from Basaveshwar Teaching & General Hospital, Government General Hospital, Gulbarga and from referred cases of private hospitals.

Inclusion criteria: In this study soft tissue tumors and tumor like lesions were studied as per the Histologic classification given in Enzinger & Weiss's 4th Edition, 2001.Histopathological study of soft tissue tumors was done in relation to age, sex, anatomical site and both benign and malignant tumors were studied. The gross morphological features were recorded as detailed in the proformaThe malignant soft tissue tumors were histologically graded by FNCLCC system (Trojani et al, 1984). Special stains like PAS, Masson's trichrome, PTAH, iron hematoxylin, reticulin were employed whenever necessary for diagnosis

Table 1: Percentage of soft tissue tumors

Total No. of biopsy specimens received	8277
Total No. of soft tissue tumors	137
Percentage of tissue tumors	1.65

During the study period, soft tissue tumors accounted for 1.65% of the total surgical specimens received in the Department.

Table 2: Percentage of soft tissue tumors among all tumors

Total No. of all tumors	1420
Total No. of soft tissue tumors	137
Percentage of soft tissue tumors among all tumors	9.64

Sex Incidence:

There are 72 males and 65 females in the present study.

Table 3: Sex-wise incidence

Benign (113)		*Malignant (24)*	
Male	*Female*	*Male*	*Female*
60 (53.09%)	53 (46.90%)	12 (50%)	12 (50%)
M:F 1.13:1		M:F 1:1	

Chi- Square test = 0.08 df =1 p>0.05 Insignificant

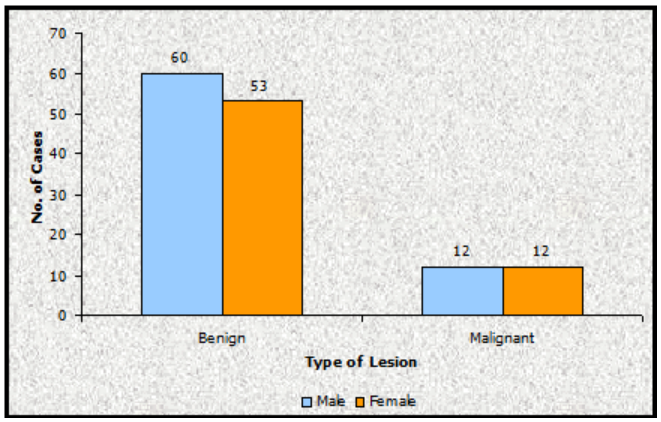

Figure 1: Sex-wise incidence

Table 4: Age distribution of benign and malignant soft tissue tumors

Age Group (Years)	*Benign*	*Malignant*
0 – 10	11	1
11 – 20	18	4
21 – 30	21	7
31 – 40	27	5
41 – 50	19	1
51 – 60	10	6
61 – 70	5	--
71 – 80	2	--
Total	*113*	*24*

Majority of benign soft tissue tumors occurred in second, third, fourth and fifth decade with a peak incidence in fourth decade.The youngest patient among benign soft tissue tumor is 1½ month male (fibrolipoma) and the oldest patient is 80 years male (capillary hemangioma).

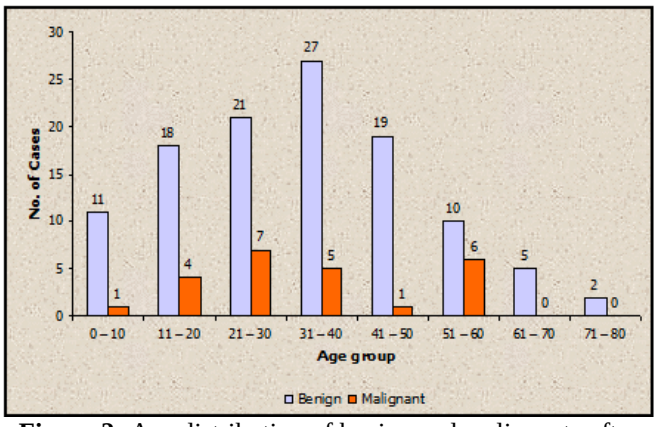

Figure 2: Age distribution of benign and malignant soft tissue tumors

Table 5: Anatomical location of benign and malignant soft tissue tumors

	Benign(113)		*Malignant(24)*	
	Number	*Percent*	*Number*	*Percent*
Head and neck	34	30	2	8.33
Trunk	32	28.31	--	--
Chest axilla and upper back	6	5.3	2	8.33
Extremities – upper	15	13.27	1	4.1
Extremities – lower	23	20.35	18	75.00
Retroperitoneum	3	2.6	1	4.1

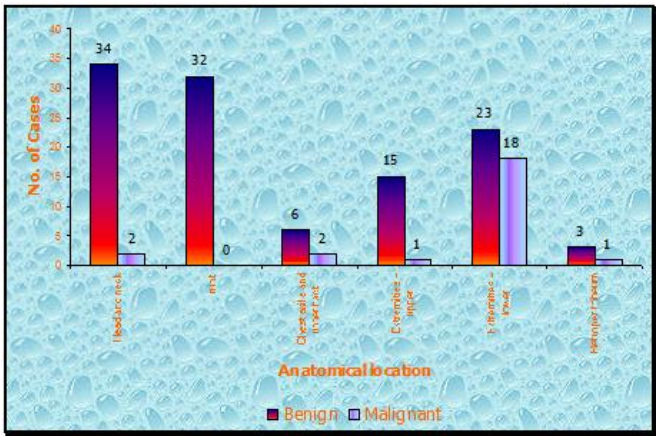

Figure 3: Anatomical location of benign and malignant soft tissue tumors

Table 6: Histological types of soft tissue tumors

Tumor type	*No. of Cases*		*Total No. of cases*	*Percent*
	Benign	*Malignant*		
Fibrous tumors	18	2	20	14.59
Fibrohistiocytic tumor	4	5	9	6.56
Lipomatous tumor	52	3	55	40.14
Smooth muscle tumors	3	--	3	2.18
Blood vessel tumors	20	2	22	16.05
Perivascular tumor	--	3	3	2.18
Tumors of lymph vessels	1	--	1	0.72
Synovial tumors	5	--	5	3.60
Peripheral nerve sheath tumors	8	1	9	6.56
Primitive neuroectodermal tumors and related lesions		4	4	2.90
Miscellaneous tumors	2	1	3	2.1
Other tumors	--	3	3	2.18

The most common histological types of tumors were adipose tissue tumors (40.14%) and next common were vascular tumors (16.05%), fibrous tumors (14.59%).

Table 7: Grading of Malignant Soft Tissue Tumors

Tumors	*Grade-1*	*Grade-2*	*Grade-3*
Fibrous (2)		Fibrosarcoma-2	
Fibrohistiocystic (4)		MFH-3	MFH-1
Lipomatous-3	Myxoid liposarcoma-1		Pleomorphic liposarcoma-2
Blood vessel-2	Epitheloid hemangio endothelioma-1	Angiosarcoma-1	
Perivascular-3	Hemangiopericytoma-2	Hemangio-pericytoma	
Peripheral nerve sheath tumor-1			MPNST-1
Primitive neuro-ectodermal tumor and related lesions-4		Extra-skeletal Ewing's sarcoma-1	Ganglioneuroblastoma -1, extra-skeletal Ewing sarcoma-2
Miscellaneous-1		Alveolar soft part sarcoma-1	
Others	Spindle cell sarcoma-1	Spindle cell sarcoma-1	Pleomorphic sarcoma-1
	5 (21%)	10 (43.47%)	8 (34.78%

Majority of soft tissue sarcomas were grade-II – 10 cases (43.47%).

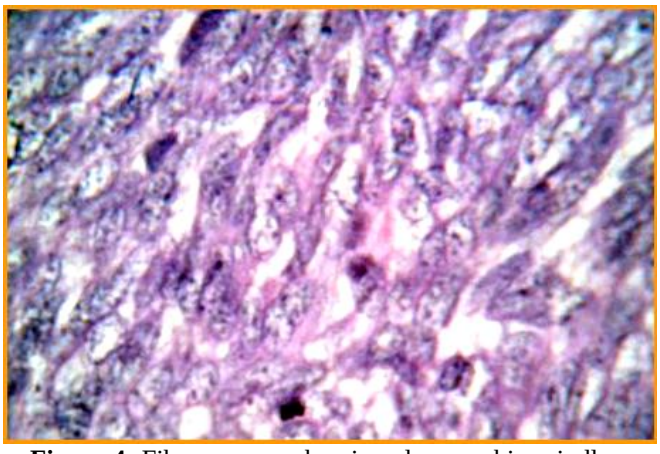

Figure 4: Fibrosarcoma showing pleomorphic spindle shaped cells with nuclear atypia (H & E X 400)

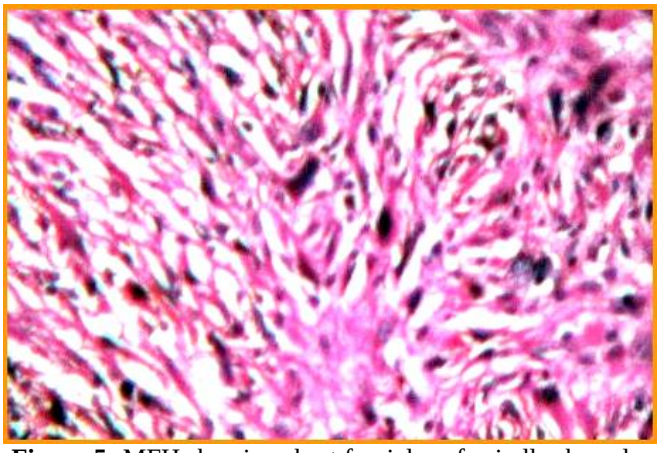

Figure 5: MFH showing short fascicles of spindle shaped cells arranged in storiform pattern (H & E X 100)

Figure 6: Myxoid liposarcoma. The tumour is globular C/s shows capsule and smooth gelatinous grey white areas

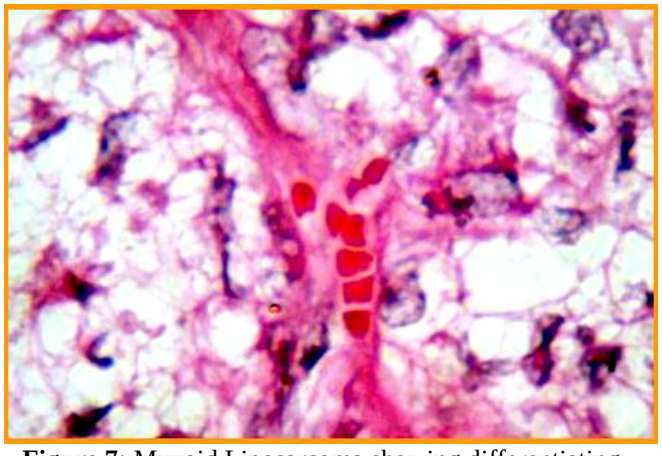

Figure 7: Myxoid Liposarcoma showing differentiating Lipoblasts, blood vessel and myxoid tissue (H & E X 400)

Figure 8: Hemangiopericytoma. The tumor is well circumscribed C/s shows grey white areas.

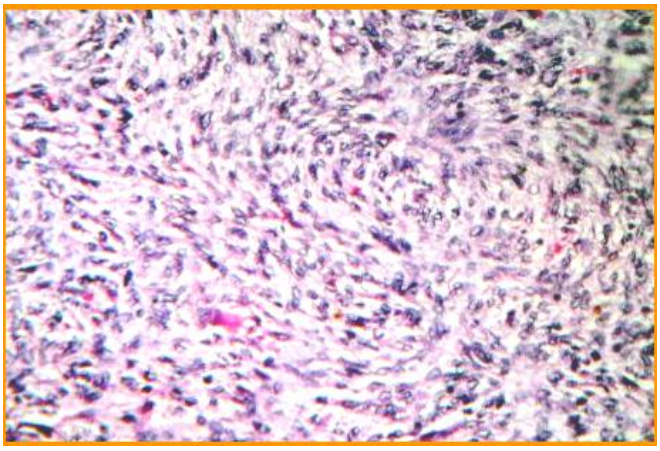

Figure 9: Hemangiopericytoma displaying thin walled branching vessels (H & E X 100)

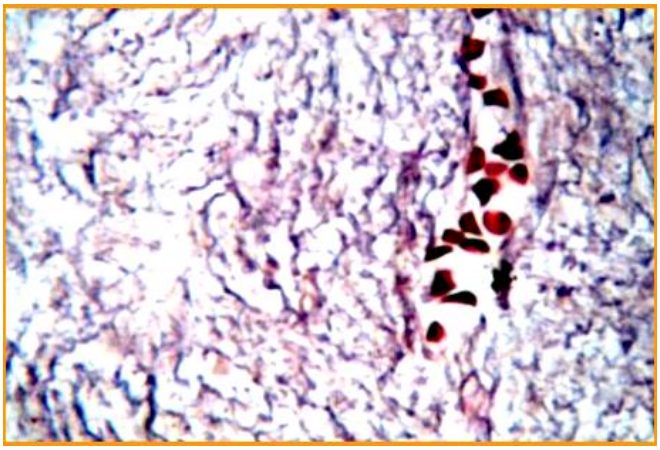

Figure 10: Hemangiopericytoma. Reticulin stain illustrates dense reticulin meshwork surrounding the tumor cells and **blood vessels.**

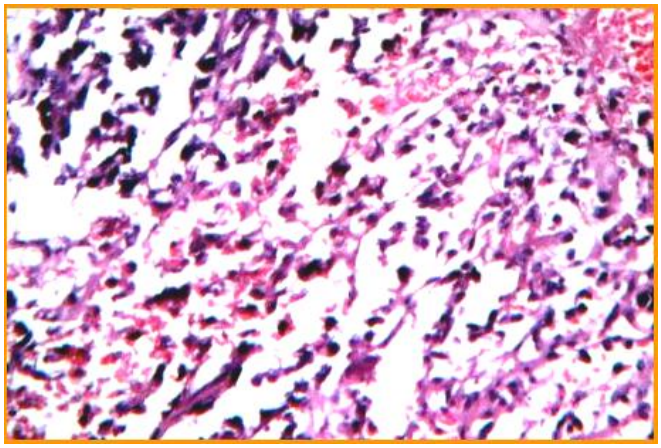

Figure 11: Angiosarcoma showing branching anastamosing vascular channels lined by atypical cells (H & E X 100)

Figure 12: Neurofibroma. The tumor is well circumscribed C/s shows grey white areas

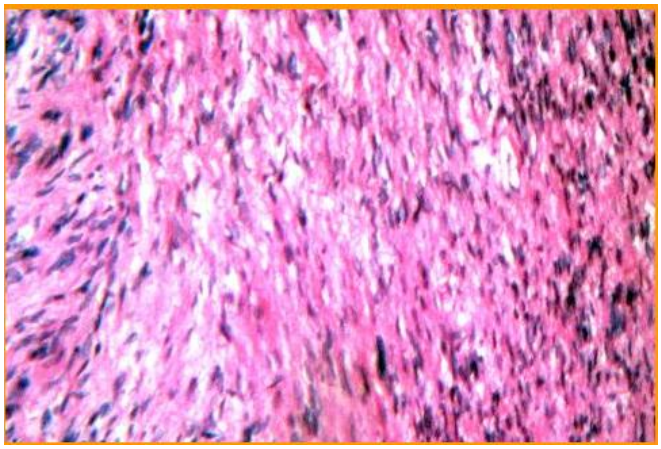

Figure 13: Neurofibroma showing interlacing bundles of spindle shaped cells with wavy nuclei (H & E X 100)

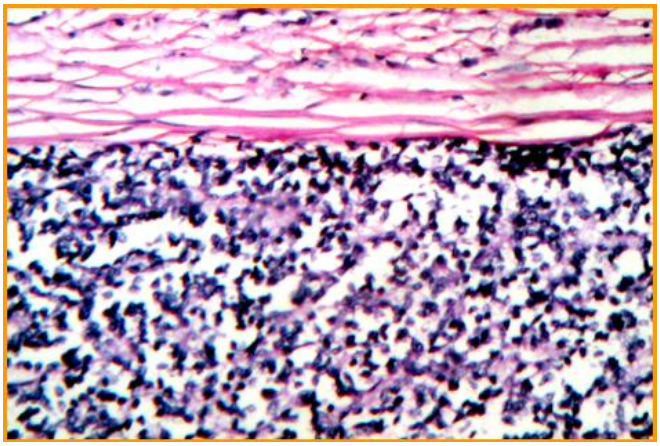

Figure 14: PNET showing well defined capsule along with cells arranged in peritheliomatous pattern (H & E X 40)

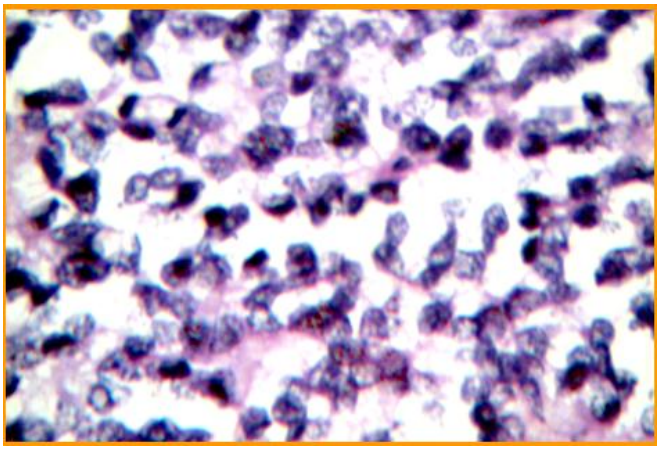

Figure 15: PNET showing uniform round to oval cells with clear cytoplasm (H & E X 400)

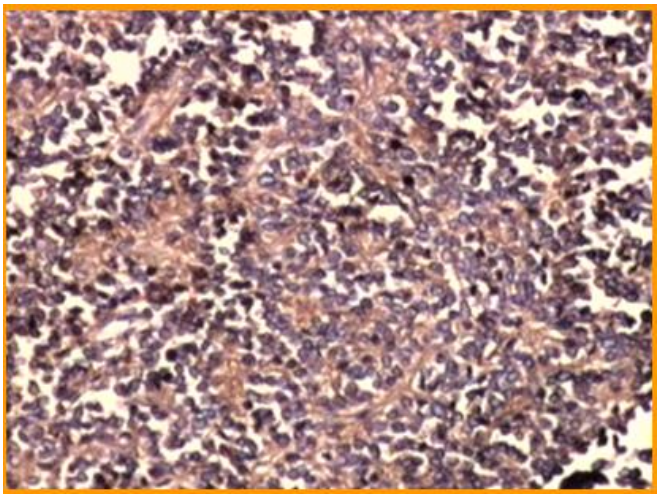

Figure 16: PNET showing Immunoreactivity for CD99 (X 100)

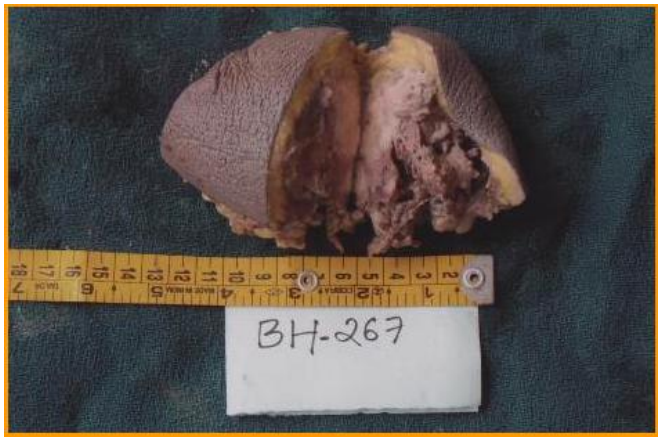

Figure 17: Pleomorphic sarcoma. The tumor is large, lobulated C/S shows grey white to yellowish areas with foci of hemorrhages and necrosis

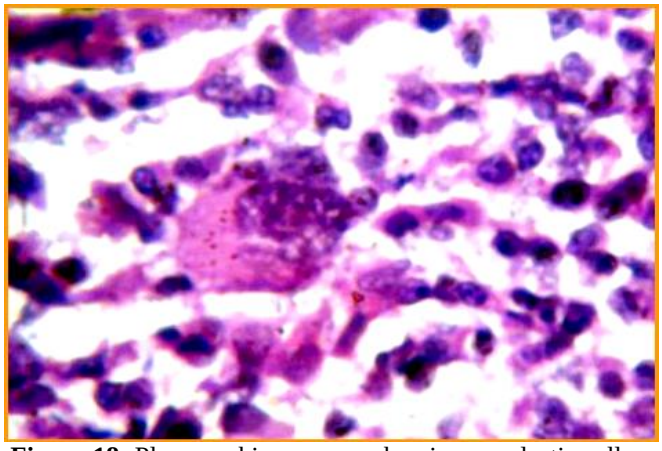

Figure 18: Pleomorphic sarcoma showing anaplastic cells with a multinucleate tumor giant cell (H&E X 400)

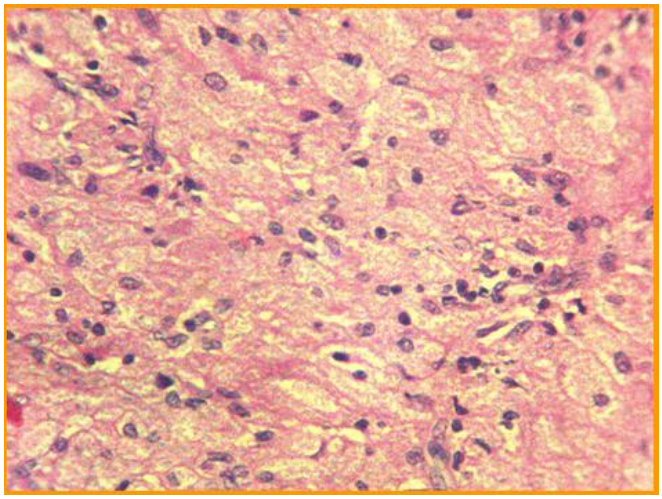

Figure 19: Granular cell tumor showing large cells with abundant eosinophilic granular cytoplasm (H &E X 400)

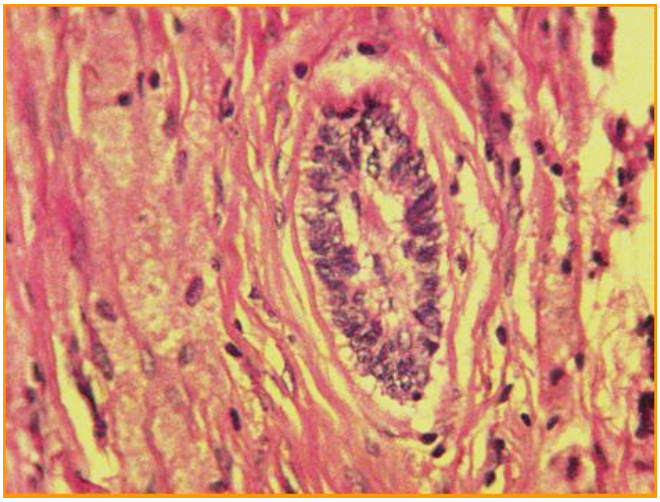

Figure 20: Granular cell tumor showing odontogenic epithelium (H & E X 400)

5. Discussion

Soft tissue can be defined as non-epithelial, extra-skeletal tissues of the body exclusive of the reticulo-endothelial system, glia and supporting tissues of various parenchymal organs. It is represented by the voluntary muscles, fat and fibrous tissue, along with the vessels serving these tissues. By convention, it also includes peripheral nervous system[1].

In the present study, a total of 137 cases of soft tissue tumors received in the Department of Pathology, M.R.Medical College, Gulbarga, were studied during the three years period from September 2004 to August 2007.

Table 8: Comparative analysis of age, sex and anatomical site distribution of soft tissue tumors

	Geeta Dev et al (1974)		*Kransdorf et al(1995)*		*Present study (2005)*	
	Benign	*Malignant*	*Benign*	*Malignant*	*Benign*	*Malignant*
Incidence (%)	83.8	16.4	60.2	39.8	82.48	17.52
Ratio (Benign: Malignant)	5.2:1		1.5:1		4.70:1	
Average age (years)	29.6	36.0	34.6	40.4	29.2	37.8
M:F	1.7:1	2.4:1	1.3:1	1.2:1	1.13:1	1:1
Anatomical common site	Head & neck	Lower extremity	Upper extremity	Lower extremity	Head, neck and trunk	Lower extremity

In the present study, there are 113 benign tumors and 24 malignant tumors with a benign-malignant ratio of 4.70:1. These results are comparable to studies conducted by Geeta Dev et al [16, 17](1974) and Lattis et al [12](1982), where the benign-malignant ratio was 5.4:1.

However, in Kransdorf (1995) study there were increased numbers of malignant tumors, because of the difficult cases being referred to the speciality centre.

Enzinger and Weiss (2001) reported a benign to malignant ratio of 100:1[1]. The annual incidence of soft tissue tumors is 300/ lakh population.[3]

This analyzes the fact that:

- **Benign soft tissue tumors out number their malignant counter parts.**
- **Soft tissue sarcoma is extremely rare and accounts for less than 1% of all cancers[1].**

In the present study soft tissue sarcomas accounted for 2.8% of all malignant neoplasms.

In the present study ratio of benign-malignant tumors is 4.70:1 but Enzinger and Weiss (2001) mentions benign-malignant ratio of 100:1[1].

This is due to the fact that many benign tumors such as lipoma and hemangioma do not undergo biopsy as compared to sarcoma, which come to medical attention quite early[1].

In the present study, the average age of benign tumors was 29.2 and that of malignant tumors was 37.8, which is comparable with the study conducted by Geeta Dev et al[16, 17].

In the present study majority of benign soft tissue tumors occurred in second, third, fourth and fifth decade of life, which were in correlation with Enzinger and Weiss [1]

The youngest patient among benign soft tissue tumor is 1½ month male (fibrolipoma) and oldest patient is 80 years female (capillary hemangioma).

In the present study majority of malignant softtissue tumors occurred in third, fourth and sixth decade of life. The youngest patient was 5 months female (Ganglioneuroblastoma).

In the present study, out of 137 cases, there were 72 male and 65 female patients. There were 60 male and 53 females in the benign category with a ratio of 1.13:1 and 12 males and 12 females in the malignant category of tumors with a ratio of 1:1.

In Geeta Dev et al[14, 15] (1974) and Kransdorf et al [16, 17](1995) studies, sarcoma showed a male predilection, but in the present study, the male-female ratio was 1:1.

In the present study, benign tumors were more common on head and neck and trunk region and malignant tumors were common on lower extremities, which were in agreement with the studies conducted by Geeta Dev et al[16, 17], Abbas et al, Potter et al and Lawrence et al[1]

Table 9: Anatomical site of soft tissue sarcoma:

	Lower extremity	*Upper extremity*	*Head & neck*	*Trunk*	*Retro-peritoneum*
Abbas et al (251)	81	42	24	66	38
Potter et al (307)	152	59	12	48	36
Lawrence et al (4550)	2110	594	406	872	568

Table 10: Comparative analysis of incidence, age, sex and anatomical site distribution of fibrous tumors

Authors	*Type of tumor*	*No. of cases (% of benign/ Malignant tumors)*	*Mean age in years (range)*	*Sex (M:F)*	*Common site*
Pritchard et al (1973)	Malignant (fibro-sarcoma)	289 (12%)	478.7% (16-89)	1.48:1	Lower extremity and trunk
Geeta Dev et al (1974)	Malignant	30 (23.9)	42.5 (4-76)	2.3:1	Lower extremity
Kransdorf (1995)	Benign	4607 (24.7)	33.4 (<1-78)	1.2:1	Trunk
	Malignant	650 (5.2)	4 (14-72)	1.1:1	Lower extremity
Present study	Benign	18 (15.92)	21 (1-50)	0.8:1	Lower extremity
	Malignant	2 (8.33)	40	0/2	Lower extremity

In the present study, fibrous tumors comprised third most common tumor among all soft tissue tumors. Fibrous tumors accounted for 20 cases that comprised 14.59% of all soft tissue tumors. The mean age, sex and site of fibrous tumors in the present study are comparable with that of Kransdorf's study[18, 19] (1995).

The incidence of fibrosarcoma is low in the present study as compared to the studies conducted by Geeta Dev et al [16, 17](1974), Kransdorf [18, 19](1995) and Pritchard et al[20]. This is because spindle cell sarcomas were overdiagnosed as fibrosarcomas in the studies conducted by Geeta Dev et al and Kransdorf.

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Table 11: Comparative analysis of incidence, age, sex and site distribution of fibrohistiocytic tumors

Authors	*Type of tumor*	*No. of cases (% of benign/ Malignant tumors)*	*Mean age in years (range)*	*Sex (M:F)*	*Common site*
Sharon W Weiss (1978)21	Malignant	200	5-93	1.77:1	Lower extremity
Kransdorf (1995)	Benign	2456 (13.1)	33 (13-51)	1.2:1	Lower extremity
	Malignant	4100 (33.1)	59 (32-80)	1.3:1	Lower extremity
Present study	Benign	4 (3.5)	49 (35-65)	1:1	Lower extremity
	Malignant	5 (20.83)	31.6 (25-38)	1.5:1	Lower extremity

MFH are the most common soft tissue sarcomas of adults[1]. Out of 1116 soft tissue sarcomas studied by Hashimoto et al[22, 23], MFH comprised 25.1% of all tumors.

In the present study there are 4 cases of MFH and 1 DFSP, together they comprised 20.83% of all malignant tumors, with a male-female ratio of 1.5:1 occurring most commonly in the lower extremity. In this study MFH is the most common tumor among all the malignant tumors.

The most common histologic type was pleomorphic storiform pattern. These findings were in comparison with the study conducted by Kransdorf et al[18] (1995) and Sharon Weiss et al[21, 22]

Despite many studies on Benign fibrohistiocystic tumors, the exact incidence is not available. In the present study there are 4 cases (3.5%) of benign fibrous histiocytoma.

The age range and anatomical location were comparable with the studies conducted by Kransdorf et al [18, 19](1995).

Table 12: Comparative analysis of incidence, age, sex and site distribution of adipose tissue tumor

Authors	*Type of tumor*	*No. of cases (% of benign/ Malignant tumors)*	*Mean age in years (range)*	*Sex (M:F)*	*Common site*
Geeta Dev et al (1974)	Benign	252 (38.3)	28 (<1-80)	1.3:1	Trunk
	Malignant	18 (14-3)	(<1-60)	3.2:1	Trunk
Pritchard et al[20] (1978)	Malignant	486 (21%)	34.5 (30-40)	1.5:1	Lower extremity
Kransdorf (1995)	Benign	3154 (16.9)	38.5 (3-74)	2.5:1	Trunk
	Malignant	1755 (14.2)	52.3 (18-80)	1.3:1	Lower extremity
Present study	Benign	52 (46.01)	33.8 (1.5-70)	1.36:1	Trunk
	Malignant	3 (12.5%)	52.5 (50-55)	0.50:1	thigh

In the present study adipose tissue tumors constituted, the commonest soft tissue tumor accounting for 37.95% of all soft tissue tumors of which classical lipoma cases were 42 accounting for 30.65% of all soft tissue tumors.

The age range of lipoma and its variants varied from 1.5 months to 70 years with a male to female ratio of 1.36:1 showing a male predominance.

These findings are in good correlation with most of the studies reported in literature (Geeta Dev et al, [16, 17]1974; Kransdorf et al [18, 19]1995 and Enzinger and Weiss [24, 25, 26]

There were 3 cases of liposarcomas accounting for 12.5% of all malignant soft tissue tumors, with an average age of 55 years and thigh being the common anatomical location. These finding are in correlation with the studies conducted by Geeta Dev et al[16, 17] and Kransdorf et al[18, 19].In study of 2310 soft tissue sarcomas[1, 26], liposarcomas comprised 21% of all sarcomas.

Table 13: Comparative analysis of incidence, age, sex and site distribution of vascular tumors

Authors	*Type of tumor*	*No. of cases (% of benign/ Malignant tumors)*	*Mean age in years (range)*	*Sex (M:F)*	*Common site*
Geeta Dev et al (1974)	Benign	139 (21-3)	8.7 (<1-65)	2.1:1	Head and neck
	Malignant	9 (7.1)	(17-60)	3.5:1	Lower extremity
Kransdorf (1995)	Benign	1418 (7.6)	28.8 (<1-65)	1:1	Head and neck
	Malignant	512 (4.1)	51 (17-84)	1.2:1	Lower extremity
Present study (2005)	Benign	20 (17.69)	31.16 (10-80)	0.8:1	Head and neck
	Malignant	2 (8.33)	46 (35-57)	1:1	Lower extremity

Hemangiomas are second most common among benign tumors constituting 20 cases accounting for 17.69% of all benign soft tissue tumors. Majority of hemangiomas occurred on head and neck. These findings are in good correlation with the studies reported by Geeta Dev et al [16, 17] (1974) and Kransdorf (1995).[18, 19]

The average age of hemangiomas in this study was 31.16 years, which is little higher as compared to studies reported by Geeta Dev et al [16, 17] (1974) and Kransdorf [18, 19](1995). This is because; in this study the age range varied from 10 to 80 years.[27, 28]

The age of Hemangioendothelioma patient was 57years which was in correlation with studies conducted.[27, 28]

In this study there were 3 cases of hemangio-pericytoma accounting for 12.5% of all malignant tumors. The age, sex and site distribution were similar to the literature given in Enzinger and Weiss (2001).

Table 14: Malignant primitive neuroectodermal tumors and related lesions

Authors	*No. of cases (percent of benign tumors)*	*Mean age in years (range)*	*Sex (MF)*	*Common site*
Extra-skeletal Ewings/ PNET	3 (12.5)	24 (16-28)	2/1	Lower extremity
Ganglio-neuroblastoma	1 (4.1)	5 months	0/1	Retroperitoneum

In the literature it is very difficult to get the exact incidence of malignant primitive neuro-ectodermal tumors. However, PNET and related lesions accounts for 1% of all malignant soft tissue tumors and are second, among the sarcomas constituting 16.67% of all sarcomas in the present study.

Their age and site distribution were in accordance with the literature given by Rosai and Ackerman[27] and Anderson [28].

Grading of Soft Tissue Sarcomas:

The following histologic features were studied in each malignant soft tissue tumors like degree of cellularity, cellular pleomorphism, mitotic activity, degree of necrosis, invasive growth, hemorrhage, inflammatory infiltrate (Broder et al, 1939)[1]

Although many grading systems have been proposed like grading of soft tissue tumors by Markhede et al[29] (1982), Myhre Jensen et al[30] (1983), Costa et al[1], but grading of soft tissue sarcomas by FNC LCC system proposed by Trojani et al[15] (1984) is the best grading system as compared to the other systems[1, 27, 28].

In this study, soft tissue sarcomas were graded by FNC LCC system as proposed by Trojani et al[15] (1984).

Majority of sarcomas were grade-2 (43.47%), followed by grade-3 (34.78%) and grade-1 (21%).

In the present study, the survival rates and recurrence rates of sarcomas could not be evaluated as majority of the cases were referred to higher centres for further management.

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References

[1] Weiss SW, Goldblum JR. General Considerations. Chapter-1 In: Enzinger and Weiss's Soft Tissue Tumors. 4th Edition, St. Louis: Mosby, 2001: 1-19.
[2] Rosenberg AE. Bones, Joints and Soft Tissue Tumors. Chapter-26 In: Robbins and Cotran Pathologic Basis of Disease by Kumar, Abbas and Fausto, 7th Edition, Saunders: Elsevier, 2004; 1273-1324.
[3] Rydholm A, Berg NO. Epidemiology of Soft tissue sarcoma in locomoter system. A retrospective population based study of interrelationships between clinical and morphological variables. Acta Pathol Microbiol Immunol Scand. 1984; 92A: 363.
[4] Krishnan Uni K. Grading of tumors. Chapter-1, Proceedings of the Fifth International CME and Update in Surgical Pathology. Hyderabad2000.
[5] Weiss SW, Goldblum JR. Approach to diagnosis of soft tissue tumors. Chapter-7 In: Enzinger and Weiss's Soft Tissue Tumors, 4th Edition, St. Louis: Mosby, 2001: 189-198
[6] Sondak VK and Chang AE. Clinical evaluation and treatment of soft tissue tumors. Chapter-2 In: Enzinger and Weiss's Soft Tissue Tumors by Weiss SW, Goldblum JR, 4th Edition, St. Louis: Mosby, 2001: 21-44.
[7] Folpe AL and Gown AM. Immunohistochemistry for analysis of soft tissue tumors. Chapter-8 In: Enzinger and Weiss's Soft Tissue Tumors by Weiss SW, Goldblum JR, 4th Edition, St. Louis: Mosby, 2001: 199-246.
[8] Gonzalez Campora R. Fine needle aspiration cytology of soft tissue tumors. Acta Cytol. 2000 May-June; 44(3): 337-43.
[9] Stout AP. Tumors of soft tissues. Atlas of Tumor Pathology, Section 2, Fasc 5, Washington DC, AFIP 1953.
[10] Pack GT, Ariel IM. Tumors of soft somatic tissues. New York, Paul B, Hoeber Inc., 1958.
[11] Dasgupta TK, Chaudhuri PK. Tumors of the soft tissue edited by Michael P. Medina, 2nd Edition, 1998: 3-11.
[12] Lattes R. Tumors of soft tissue. In: Atlas of Tumor Pathology, 2nd Series, Fascicle 1, Revised. Armed Forces Institute of Pathology, Washington DC. 1983.
[13] Costa J, Wesley RA, Glatstein E. The grading of soft tissue sarcomas – Results of a clinicopathologic correlation in a series of 163 cases. Cancer. 1984; 53: 530-541.
[14] Coindre JM, Trojani M, Contesso G. Reproducibility of a histopathologic grading system for adult soft tissue sarcoma. Cancer 1986; 58: 306-309.
[15] Trojani M, Contesso G. Soft tissue sarcomas of adults. Study of pathological prognostic variables and definition of a histopathological grading system. Int J Cancer. 1984; 33: 37-42.
[16] Geeta Dev, Banerjee AK and Aikat BK. Soft tissue tumors Part-I: Benign tumors. The Indian J of Cancer. 1974; 336-343.
[17] Geeta Dev, Banerjee AK and Aikat BK. Soft tissue tumors Part-II: Malignant tumors. The Indian J of Cancer. 1974; 344.
[18] Kransdorf MJ. Malignant soft tissue tumors in a large referral population: Distribution of diagnosis by age, sex and location. Am J Roentgenol. 1995; 164: 129.
[19] Kransdorf MJ. Benign soft tissue tumors in a large referral population: Distribution of specific diagnosis by age, sex and location. Am J Roentgenol. 1995; 164: 395
[20] Pritchard DJ, Soule EH, Taylor WF. Fibrosarcoma – A clinicopathologic and statistical study of 199 tumors of the soft tissues of the extremities and trunk. Cancer. 1974; 3: 888.
[21] Weiss SW, Goldblum JR. Benign fibrohistiocytic tumors. Chapter-13 In: Enzinger and Weiss's Soft Tissue Tumors, 4th Edition, St. Louis: Mosby, 2001: 441-490.
[22] Weiss SW, Goldblum JR. Malignant fibrohistiocytic tumors. Chapter-15 In: Enzinger and Weiss's Soft Tissue Tumors. 4th Edition, St. Louis: Mosby, 2001: 535-569.
[23] Weiss SW, Enzinger FM. Myxoid variant of MFH. Cancer. 1977; 39: 1672.
[24] Weiss SW, Goldblum JR. Benign lipomatous tumors. Chapter-16 In: Enzinger and Weiss's Soft Tissue Tumors. 4th Edition, St. Louis: Mosby, 2001: 571-639.

[25] GebhardS, Coindre M.Pleomorphic liposarcoma: Clinicopathologic, immunohistochemical, and follow up analysis of 63 cases -–A study from the French Federation of Cancer Center Sarcoma group. Am J of Surg Pathol. May 2002; 26(5): 601-616.
[26] Weiss SW, Goldblum JR. Liposarcoma. Ch Weiss SW, Goldblum JR. Liposarcoma. Chapter-17 In: Enzinger and Weiss's Soft Tissue Tumors. 4th Edition, St. Louis: Mosby, 2001: 641-693.
[27] Rosai J. Soft tissues. Chaper-25 In: Rosai and Ackerman's Surgical Pathology, Vol. 2, 9th Edition, Mosby. 2004: 2237-2372.
[28] Miettinen M and Weiss SW. Soft tissue tumors. Chapter-72 In: Andersons Pathology, Vol. 2, by Damjanov I and Linder J, 10th Edition, Mosby, 1996: 2480-2530.
[29] Markhede G, Angervall L, Stener B. A multivariate analysis of the prognosis after surgical treatment of malignant soft tissue tumors. Cancer 1982; 49:1721-1733.
[30] Myhre Jenson O, Kaes, Madsen EH. Histological grading of soft tissue tumors, relation to survival in 261 surgically treated patients. Acta Pathol Microbiol Immunol Scand. 1983; 91A: 145