CHAPTER (IV)

- Results -

Table (1) :

Distribution of the sample studied according to age and sex :

Age group/year	mean age	Males		Females		Total
		no.	mean age	no.	mean age	
-20 - <30	23.82	10	23.45	10	24.35	20
-30 - <40	34.12	10	32.14	10	36.21	20
-40 - <50	47	10	47.2	10	46.85	20
-50 - <60	55.12	10	56.85	10	53.84	20
-60 - <70	65.18	10	64.12	10	66.46	20

Table (2) :

Mean " weight' , + S.D of the subject studied in the sample at different age groups :-

Age group	Males		Female		t .	p .
	Mean	± S.D	Mean	± S.D		
20 - 30	69.33	±9.83	59.9	±7.22	2.4635	< 0.05
30 - 40	75.31	±11.32	67.5	±5.85	1.9791	> 0.05
40 - 50	71	±8.62	64.22	±15.56	1.143	> 0.05
50 - 60	65.78	±7.12	71.78	±16.76	0.9884	> 0.05
60 - 70	65.55	±8.51	56	±10.93	4.9168	< 0.001

P > 0.05 = Statistically non significant
P < 0.05 = Statistically significant
P < 0.01 = High statistical significance

Table (3):

Mean & S.D of the "height" at different age groups.

Age group/year	Males		Females		t	p
	Mean	± S.D	Mean	± S.D		
20 - <30	174.92	±9.09	160	±8.87	3.8746***	<.001
30 - <40	173.08	±7.8	161.3	±3.5	4.4243***	<.001
40 - <50	170.11	±8.24	155.67	±7.4	3.9134***	<.01
50 - <60	171	±4.36	158.67	±8.69	3.8062***	<.01
60 - <70	167.45	±5.99	152.38	±7.39	4.9168***	<.001

Results

- **Study of some radiological measurements and morophology of the lumbar spinal canal in 100 normal adult Egyptian subjects ranged in age from 20-70 years revealed the following** :[Table 1 - fig's. 15 - 24] :-

- The mean weight was generally higher in the males than in females, except at the age group (50- 60) years, and the difference was statistically significant in the age group (20 - 30) and highly statistically significant in the age group (60 - 70) years . [table 2].

- The mean height of males was higher than that of females in all age groups and this difference was highly statistically significant . [table 3]

- The mean transverse diameters of the lumbar spinal canals were larger in males than in females at all levels ; and the differences were statistically significant at L1, and highly statistically significant at L2 and L3. [table4] .

- The differences between males and females at L2 , L3 and L4 ranged from 1 - 1.25 mm. while at L1 and L5 they did not exceed 1mm.

- There was a great variability at L4 in females (S.D > 4), and at L5 in both sexes (S.D > 3) .
- For the purpose of clinical appraisal of patients suspected of having morphometric spinal canal anomalies, the ranges within which 95% of the normal population are expected to fall serve as a quick reference (Amonoo - Kuofi et al, 1990). These 95% cofidence intervals were calculated for each segmental level for both males and females . These ranges are given in [table 5] and they show that there is a marked overlap of the 95% confidence intervals of males and females.

Table (4):

Mean lumbar transverse diameter (M.T.D,) & standard diviation (S.D) in mm, in male and female adult Egyptian subjects :

Level	Males		Females		t	p
	Mean	S.D	Mean	S.D		
L1	22.6	2.01	21.77	1.69	2.2113	<.05
L2	23.48	1.78	22.38	1.56	3.2406	<.01
L3	24.21	1.79	23	1.52	3.5283	<.01
L4	24.85	2.08	24.8	4.46	0.1403	>.05
L5_	28.07	3.12	27.5	3.22	0.8947	>.05

Table (5) .

Normal renges (N.R), 95 % Confidence Intervals (C.I) of transverse diameter for each segmental level :

level	Males		Females m.m	
	N.R	95 % C . I	N. R	95 % C . I
L1	17.33 - 26.09	22.05 - 23.15	17.00 - 25.42	21.26 - 22.27
L2	19.80 - 26.43	22.99 - 23.97	18.11 - 26.14	21.92 - 22.84
L3	19.55 - 27.62	23.72 - 24.70	18.91 - 26.44	22.51 - 23.48
L4	20.40 - 28.90	24.24 - 25.37	20.10 - 51.88	23.58 - 26.23
L5	23.46 - 43.52	27.22 - 28.92	19.80 - 35.06	26.55 - 28.46

Table (6) :

Inter-segmertal differences in lumbar Transverse diameter of adult males and females.

Level	Male differences m.m	Female difference m.m
L1 / L2	0.88	0.61
L2 / L3	0.73	0.62
L3 / L4	0.64	1.8

- The minimum transverse diameter of the lumbosacral canal was 17 mm in females and 17.33mm in males, and the maximum transverse diameter was 51.88mm in females and 43.52mm in males .[table 5 and 7- Fig's . 11and 12]

- It has been observed that , the intersegmental differences did not exceed 0.9 mm, from L1 to L4, except between L3 and L4 in females (1.8 mm). Differences between L4 and L5 were much larger , being 2.7 mm in females and 3.22 mm in males . Intersegmental differences increase proximo-distally in females, but this is not clear in males [table 6] .

- There was no statistical significance for the difference between Mean transverse diameter , and age at all segmental levels in both males and females [table 7]..

- There was a steady narrowing of the mean anteroposterior diameter from the level of the first lumbar (L1) to the third lumbar (L3) , then followed by widening at L4 and L5 in both sexes. At all levels ; the mean sagittal diameter of the females was narrower than that of the males and this difference was statistically significant at L1 and L2 [tables 9 and 10 - Fig 13] .

- The minimum value of the anteroposterior diameter was 13.09 mm [table 10]

- There was no statistical significance for the difference between the mean anteroposterior diameter , and age in both sexes at all segmental levels , except at L1 & L4 in females . [Table 11] .

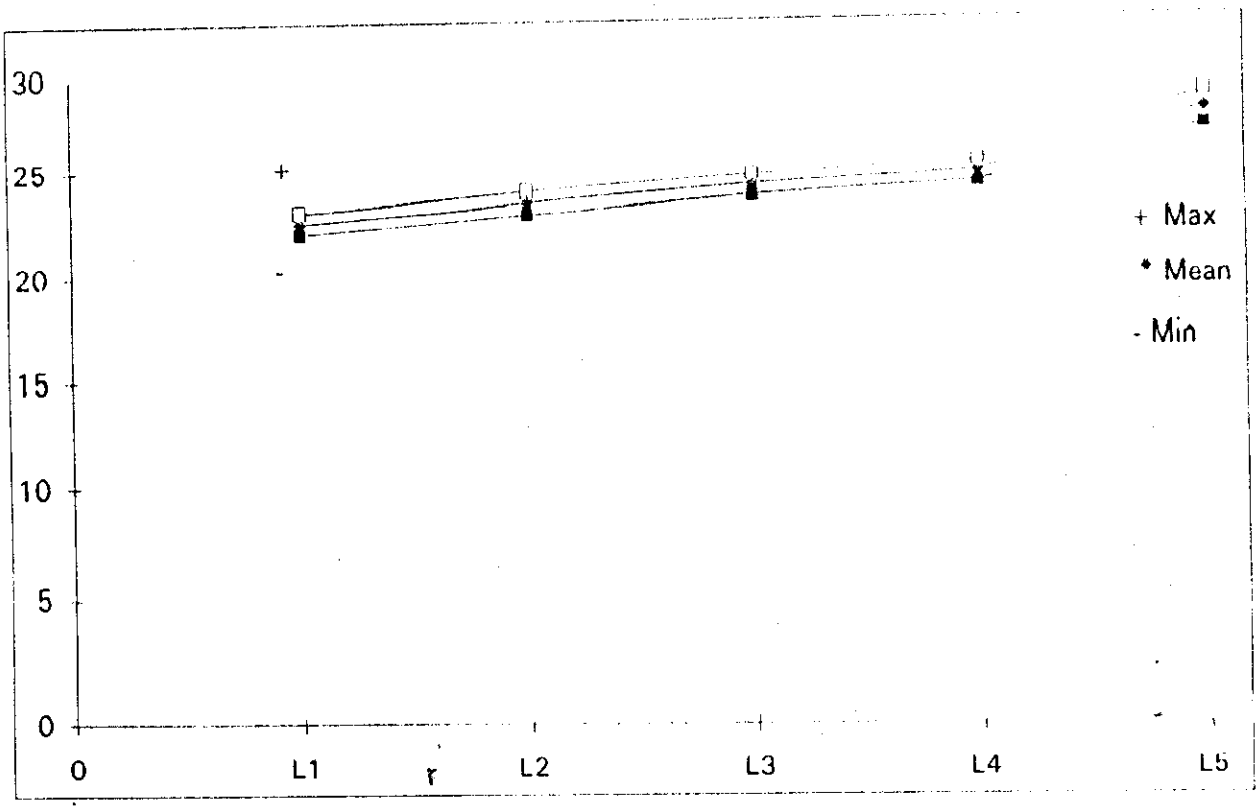


Fig (11)

Transverse diameter of the lumbar spinal canal in male subjects

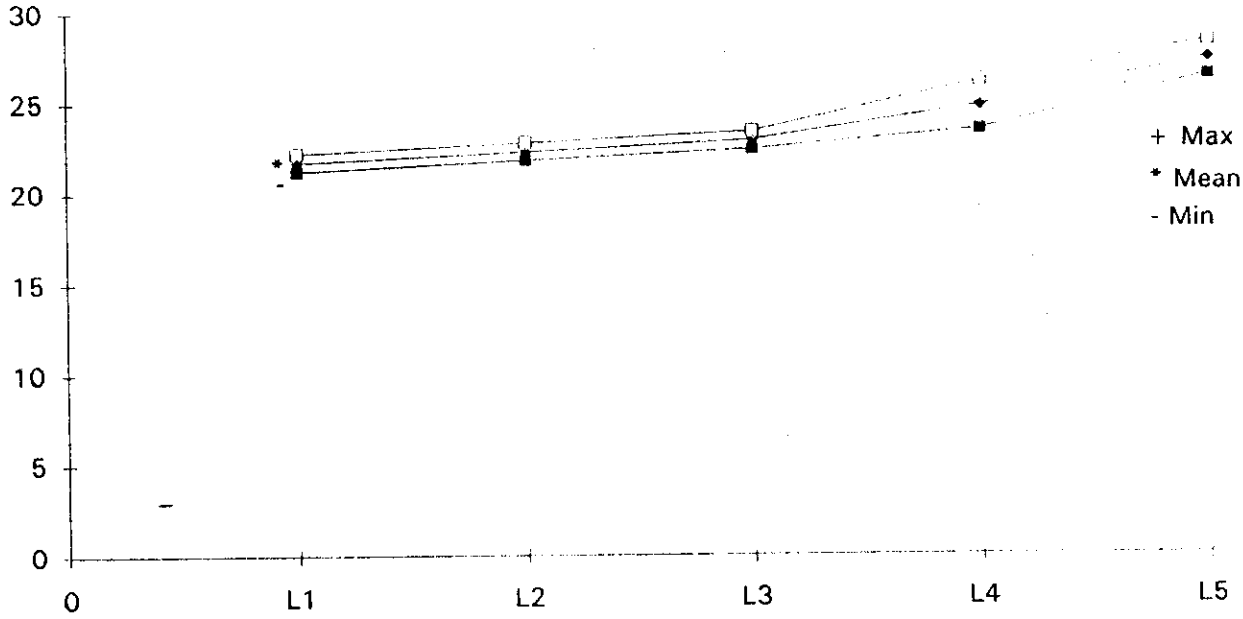


Fig (12)

Transverse diameter of the lumbar spinal canal in female subjects

Table (7) :

Mean transverse diameter (M.T.D) of the lumbar spinal canal at different segmental . levels in both sexes in two age groups:
Group (A) : for ages 20 - < 40 years old.
Group (B) : for ages 40 - < 70 years old.

Levels	Group [A]		Group [B]		t	p
	mean	S.D	mean	S.D		
L1	22.24	1.88	22.91	2.11	1.2142	>.05
	21.75	1.23	21.78	2	0.064	>.05
L2	23.2	1.79	23.72	1.78	1.0628	>.05
	22.43	1.48	22.34	1.65	0.1992	>.05
L3	24.15	1.66	24.26	1.92	0.2205	>.05
	23.17	1.65	22.86	1.62	0.6479	>.05
L4	24.57	1.89	25.01	2.24	0.7731	>.05
	24.46	1.7	25.25	5.78	0.5904	>.05
L5	27.46	2.15	28.59	3.72	1.3379	>.05
	28.06	2.59	27.07	3.63	1.034	>.05

Table (8).

Comparison between Mean Transevers Diameter in the present study, and in some previous works :

Author (s)	Year	Race	Males						Females					
			No.	L1	L2	L3	L4	L5	*No.*	L1	L2	L3	L4	L5
Present study	1994	Egyptians	50	23	23.5	24.2	24.9	28.1	50	21.8	22.38	23	25	27.5
El-Haggagy et al:	1992	Egyptian	50	26.30	27.70	28.60	30.00	31.90	50	26.30	27.60	28.6	30	32.70
Amonoo - Kuofi	1990	Saudies	160	25.1	25.3	26.2	27.2	30.9	180	23.5	24	25.2	27	29
Piera et al :	1988	Spanish	110	27.8	28.3	29.4	30.9	34.3	105	26.6	26.25	27.4	30	33.39
Amonoo - Kuofi :	1982	Nigerians	150	22.6	22.7	24.5	26	28.7	140	21.3	22.5	23.7	25	28.4
Eisenstein :	1977	South African :												
		a - caucasoids :	78	23	24	23	24	26	35	22	22	23	23	25
		b - Zulus :	108	21	22	22	23	26	54	20	21	21	22	24
Hinck et al:	1966	Americans :	59	25.9	26.5	26.8	27.6	30.7	59	24.3	24.9	25.4	26.4	28

Table (9):

Mean &± S.D of the antero-posterior diameter in male and female adult Egyptian subjects :

Level	Males		Females		t	p
	Mean	S.D	Mean	S.D		
L1	18.52	1.24	17.75	1.42	2.8789	<.01
L2	17.48	1.52	16.91	1.26	2.0353	<.05
L3	16.37	1.36	16	1.27	1.4215	>.05
L4	17.8	1.61	16.82	1.29	1.0919	>.05
L5	17	1.54	17.31	1.51	0.3077	>.05

Table (10) :

Ranges of antero-posterior diameters in each segmental level in adult male & female Egyptians.

Level	No.	Males		Females	
		Normal range (N.R)	95% Confid.Int. (C.I)	Normal range (N.R)	95% Confid.Int. (C.I)
L1	100	15.95 - 21.46	18.17 -18.85	13.94 -20.74	17.33 -18.174
L2	100	13.09 -19.76	17.06 -17.89	13.78 -19.55	16.53 -17.27
L3	100	12.90 -18.78	16.00 -16.74	13.24 -19.06	15.62 -16.37
L4	100	13.36 -18.25	16.10 -19.70	14.25 -19.44	16.43 -17.19
L5	100	14.25 -20.41	17.39 -18.21	14.63 -20.91	17.26 -18.15

Table (11) :

Mean anteroposterior diameter (A.Pdiameter) of the lumbar spinal canal in both sexes, at different segmental levels; in two age groups:

Group [A] : for ages 20 - < 40 years old.

Group [B] : for ages 40 - < 70 years old.

level		Group [A]		Grpoup [B]		p
		mean	S.D	mean	S.D	
L1	M	18.74	1.26	18.32	1.21	>0.05
	F	18.31	1.17	17.33	1.46	<0.05*
L2	M	17.9	1.24	17.12	1.67	>0.05
	F	17.3	1.09	16.6	1.32	>0.05
L3	M	16.69	1.26	16.1	1.39	>0.05
	F	16.4	1.25	15.68	1.21	>0.05
L4	M	17.18	1.37	16.86	1.58	>0.05
	F	17.29	1.19	16.46	1.26	<0.05*
L5	M	17.95	1.49	17.68	1.54	>0.05
	F	18.03	1.35	17.46	1.6	>0.05

Table (12):

Comparison between measurements of the mean antero posterior diameter of the lumbar spinal canal in the present study and in other previous works :

Author (s)	Year	Race	Males						Females					
			n	L1	L2	L3	L4	L5	n	L1	L2	L3	L4	L5
Present study	1994	Egyptians	50	18.5	17.5	16.4	17.8	17.9	50	17.8	16.9	16	16.8	17.3
Amonoo-Kuofi	1985	Nigerians	79	16.6	15.8	14.9	15.6	16	43	15.8	15.1	14.2	14.1	14.6
Eisenstein	1977	South African												
		a - Zulus	108	16	15	15	15	16	54	17	16	15	16	16
		b - Sotho	106	16	15	14	15	16	62	16	16	15	15	16

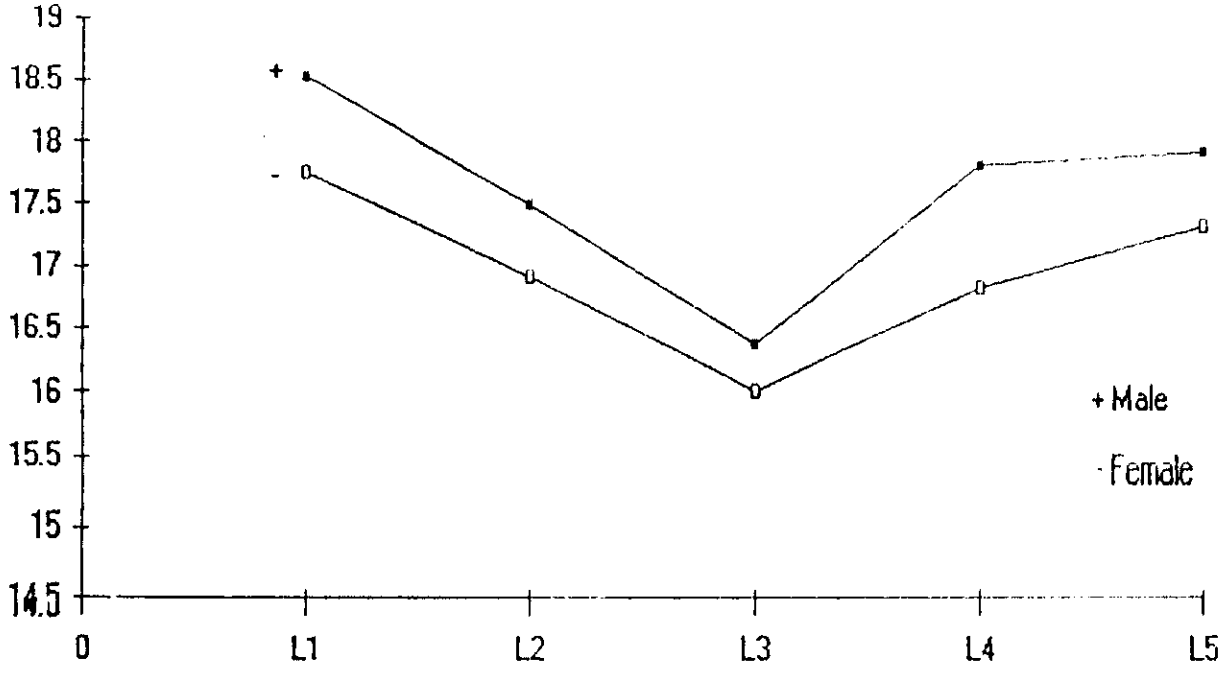


Fig (13)

Mean anteroposterior (midsagittal) diameter of the lumbar vertebral canal in males (+) and females (-) .

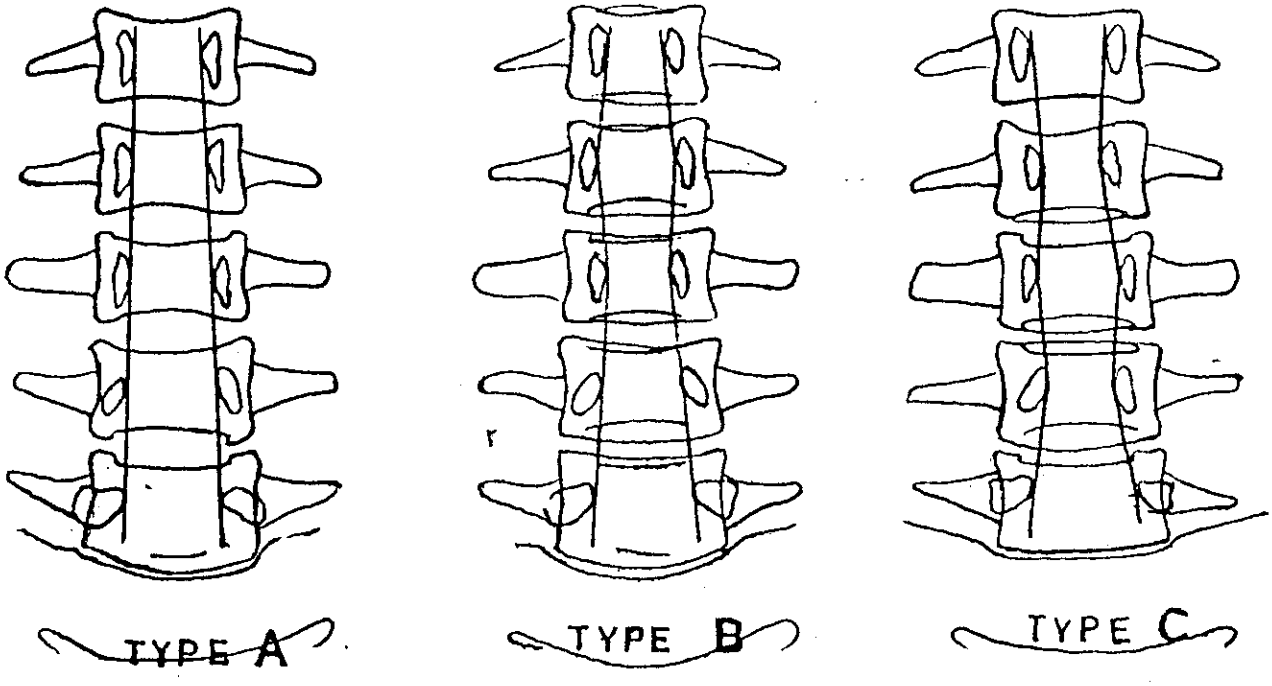


Fig. (14) Morphological types of the lumbar spinal canal in Normal Adult Egyptians .

- The shape adopted by the lateral limits (transverse diameters) of the spinal canal have led us to define 4 morphological types and 7 subtypes of the spinal canal "Fig14" : -

- ***Type(A) :-***

When each transverse diameter is greater, or at least equal, to the one immediately above it. Thus, the shape of the lateral limits is that of a slender high trapeze, a little bit broader at the (lower or caudal) base .

- ***Type(B) :-***

When a certain transverse diameter is smaller than that immediately cranial to it , while the caudal vertebrae continue to increase normally . This arrangement has 4 variants ; depending on whether the relative stenosis is found at L2, L3, L4 or L5 (subtypes B2, B3, B4 and B5) .

- ***Type (C) :-***

Was less frequently encountered , where two lumbar levels have transverse diameters less than that immediately cranial to them . In our work , these two lumbar levels were found at L2and L3 (Subtype C 2-3) , L3 and L4 (Subtype C3 - 4) and finally at L2 and L4 (Subtype C2 - 4) .

- [Table 13] gives the number of cases found of each type and subtype described , their percentages out of the total number of the sample , and the distribution of the different morphologies in both sexes.

- The mean width of the vertebral body increases steadily from L1 to L5 in both sexes and it was larger in the males than in females at all levels ; and the difference was highly statistically significant at all levels except L5 [table 14] .
- The canal / body ratio in males was nearly 0.6 at L1 to L3 , while it was nearly 0.5 at L4 and L5 . The corresponding ratios in females were nearly 0.6 at L1 to L4 , and nearly 0.5 at L5 [table 15] .

Table (13):

Distribution of the different morphologies of lumbar spinal canal in both sexes, and their percentages to the total number of the population.

Types & Sub-types	male		Female		Total	
	No	%	No	%	No	%
A	30	30%	32	32%	62	62%
B	15	15%	12	12%	27	27%
C	5	5%	6	6%	11	11%
D						
B2	5	5%	3	3%	8	8%
B3	4	4%	3	3%	7	7%
B4	6	6%	3	3%	9	9%
B5			3	3%	3	3%
C2-3	1	1%	4	4%	5	5%
C3-4	3	3%	1	1%	4	4%
C2-4	1	1%	1	1%	2	2%
	-	-	-	-	-	-

Table : (14)

Mean and S.D of the vertebral body width for each segmental level in both sexes of adult Egyptian subjects.

Level	Male		Female		T	P
	mean	S.D	mean	S.D		
L1	39.59	3.95	35.98	2.8	4.0378	< 0.01***
L2	41.86	3.07	37.87	2.78	6.7615	< 0.01***
L3	44.03	4.85	40.73	2.84	4.0619	< 0.01***
L4	47.41	3.22	43.74	3.13	5.7412	< 0.01***
L5	52.96	4.9	50.18	4.15	3.0434	> 0.05

Table (15) :

Relationship between the mean transverse diameter (M.T.D) of the lumbar spinal canal,and the width of vertebral body (W)i.e canal to body ratio (C/B) in both sexes, at each segmental level :

Level	Males			Females		
	M.T.D mm	W mm	C / B	M . T . D mm	W mm	C / B
L1	22. 60	39.59	0.57	21.77	35.98	0. 60
L2	23.48	41.86	0.56	22.38	37.87	0.59
L3	24,21	44.03	0.55	23 .00	40.73	0.56
L4	24. 80	47.41	0.52	24 .90	43.74	0.57
L5	28.07	52.96	0.53	27 .50	50.18	0.54

Table (16) :

Mean & ± S.D of the " sum" of pedicle thickness in both sexes at each segmental level.

Level	Males		Females		t.	P.
	mean	± S.D	mean	± S.D		
L1	14.08	2.45	12.36	2.33	3.5812***	< 0.001
L2	15.44	2.43	12.59	2.45	5.9202	> 0.05
L3	17.44	3.06	15.41	2. 90	4.2169***	< 0.001
L4	20.65	3.18	18.16	2.97	4.0269***	< 0.001
L5	19.34	3.95	17.23	3.51	2.8014**	< 0.01

Table (17) :

Correlation between the sum of the pedicle thicknesse and transverse diameter of the lumbar spinal canal in both sexes at each segmental level .

Level	Males		Females	
	r	P	r	P
L1	-0.448	< 0.01	-0.259	> 0.05
L2	-0.338	< 0.05	-0.221	> 0.05
L3	-0.331	< 0.05	-0.267	> 0.05
L4	-0.137	> 0.05	-0.051	> 0.05
L5	-0.284	< 0.05	-0.073	> 0.05

- The mean of the "sum" of pedicle thicknesses was larger in males than in females at all levels, and this difference was highly statistically significant at all levels except L2 [table 16] .

- There was a statistically significant correlation between the sum of the pedicle thicknesses , and the transverse diameter of the lumbar spinal canal in males at all levels except L4 , and it was non significant in females at all levels. [table 17] .

- There was a statistically significant correlation between the transverse diameter of the spinal canal and both weight and height of the sample studied at all levels except L4 . When this correlation was studied with respect to sex, we found that : In males , it was statistically significant for height at all levels except L4 , and non significant for weight at all levels . In females , it was statistically significant for weight at all levels except L4, and non significant for height except at L3. [table 18] .

- There was a statistically significant correlation between the anteroposterior diameter and both weight and height at L1 & L2, and for height at L3 & L5 . When this correlation was studied with respect to sex , we found that ; it was significant for height in males at L2 , L3, and L5 ; and in females ; at all levels, It was non significant for weight in both sexes at all levels . [table 19] .

- There was a statistically significant correlation between the chronological age and height for both sexes and not for weight. [table 20] .

- There was no statistically significant correlation between the chronological age and the following variables : ,

Transverse , anteroposterior diameters of the canal, width of the vertebral body

Table (18) :

Correlation between the transverse diameter of the lumbar spinal canal, and weight and Height in both sexes, at each seqmental level .

Level	Male				Female				Total.			
	Weight		Height		Weight		Height		Weight		Height	
	r	p	r	p	r	p	r	p	r	p	r	p
L1	0. 1602	> 0.05	0.2973	< 0.05	0.3397	< 0.05	0.2422	> 0.05	0.2812	< 0.01	0.3438	< 0.01
L2	0. 1343	> 0.05	0.2795	< 0.05	0.3823	< 0.01	0.2724	> 0.05	0.3076	< 0.01	0.4025	< 0.01
L3	0. 1820	> 0.05	0.3288	< 0.05	0.4839	< 0.01	0.3618	< 0.05	0.3816	< 0.01	0.4545	< 0.01
L4	0. 0363	> 0.05	0.1649	> 0.05	0.0679	> 0.05	0.1058	> 0.05	0.0517	> 0.05	0.079	> 0.05
L5	0. 1970	> 0.05	0.1768	> 0.05	0.2151	> 0.05	2393	> 0.05	0.2203	< 0.05	0.213	< 0.05

Table (19) :

Correlation between the Antero-posterior diameter of lumbar spinal canal, and the weight and height in both sexes for each segmental level.

level	Variable	Male		Female		Total	
		r	P	r	P	r	P
L1	- Weight	0.1369	> 0.05	0. 2260	> 0.05	0.2419	< 0.05
	- Height	0.2316	> 0.05	0. 4699	< 0.01	0.4363	< 0.01
L2	- Weight	0.1696	> 0.05	0. 2306	> 0.05	0.2336	< 0.05
	- Height	0.2896	< 0.05	0. 123	< 0.01	0.4158	< 0.01
L3	- Weight	0.1157	> 0.05	0. 0805	> 0.05	0.1276	> .05
	- Height	0.2695	< 0.05	0. 4755	< 0.01	0.3611	< 0.01
L4	- Weight	0.1016	> 0.05	0. 0459	> 0.05	0.0495	> 0.05
	- Height	0.2556	> 0.05	0. 5189	< 0.01	0.1547	> 0.05
L5	- Weight	0.1161	> 0.05	0. 0257	> 0.05	0.0479	> 0.05
	- Height	0.2753	< 0.05	0. 3715	< 0.05	0.2588	< 0.01

Table (20) :

Correltion between the "chronological age" and weight and height in both sexes:

Sex	Weight		
	r	p	p
males	-0.228	> 0.05	< .05
Females	-0.015	> .05	< .05

, and the sum of pedicle thicknesses [Table 21] .

- There was a statistically significant correlation between the transverse and anteroposterior diameters of the lumbar spinal canal at L1 , L2 and L3 , but non at L4 & L5 . When we studied this correlation with respect to sex , we found that , it was statistically significant only for females at L2 & L3. [table 22] .

- There was a statistically significant correlation between the transverse diameter of the spinal canal and the width of vertebral body at L2 & L3.

In males , it was only statistically significant at L3 and L4, and in females at L1 only . [table 23] .

Table (21):

Carrelation betwee n the "Chr-onological age" and the following variables : transverse diameter, antero- posterior diameter, v ertebral body width, and the sum of pedicle thickness in both sexes at different levels:

Level	Sex	Transvers e diameter		Ant. post diameter		Width of verteb body.		Sum of pedicle thickness	
		r	p	r	p	r	p	r	p
L1	M	0.0527	> .05	-0.1061	> .05	0.0464	> .05	-0.1553	> .05
	F	0.0475	> .05	-0.1048	> .05	0.0012	> .05	-1743	> .05
L2	M	0.085	> .05	-0.1538	> .05	-0.0251	> .05	-0.1586	> .05
	F	0.0259	> .05	-0.0581	> .05	0.2127	> .05	0.0077	> .05
L3	M	-0.0121	> .05	0.044	> .05	-0.0476	> .05	0.0229	> .05
	F	-0.0354	> .05	-0.0595	> .05	0.0755	> .05	-0.0309	> .05
L4	M	0.0768	> .05	-0.082	> .05	-0.0475	> .05	-0.1202	> .05
	F	-0.0947	> .05	-0.1054	> .05	0.1576	> .05	-0.1485	> .05
L5	M	0.2029	> .05	-0.0258	> .05	-0.0265	> .05	0.106	> .05
	F	-0.1612	> .05	0.0159	> .05	-0.0012	> .05	-0.0056	> .05

Table (22):

Correlation between the transvere diameter of lumbar spinal canal, and the anteroposterior diameter in both sexes for each segmental level:

Level / Variable	Male	Female		Total	
	r	r	p	r	p
L1	0.1412	0.2816	> .05	0. 2500	< .05
L2	0. 1480	0.4167	< .01	0.2956	< .01
L3	0.2681	0.3149	< .05	0.3159	< .01
L4	0.2742	-0.051	> .05	0.0158	> .05
L5	0.1775	0.1009	> .05	0.1439	> .05

Table (23)

Correlation between the transuerse diameter of the spinal canal, and the width of verteleral body in both sexes for each segsnental level .

Level / *Variable*	*Male*		*Female*		*Total*	
	r	*p*	*r*	*p*	*r*	*p*
L1	-0.191	>0.05	0.441	< 0.01	0.0567	> 0.05
L2	0.2393	> 0.05	0.1532	> 0.05	0.3361	< 0.01
L3	0.4251	< 0.01	0.1852	> 0.05	0.0968	< 0.01
L4	0.0289	< 0.05	0.0435	> 0.05	0.0993	> 0.05
L5	0.3127	> 0.05	-0.116	> 0.05	0.0054	> 0.05

Table (24):

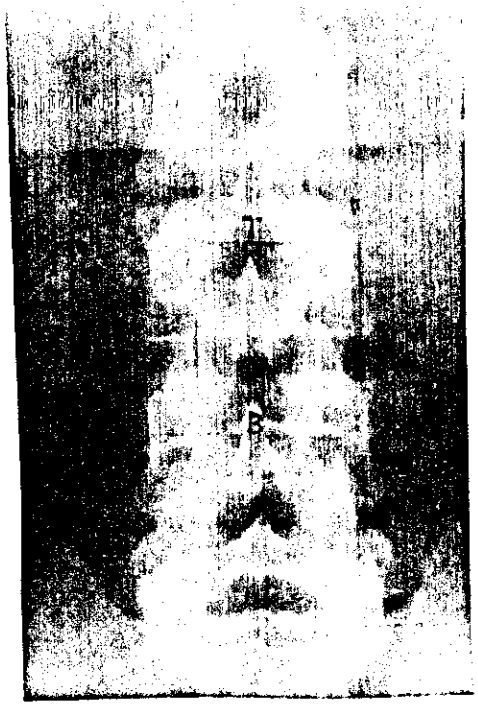
Multiple Regression of T.D. with three variables (Age, weight & height) at each. level. in both sexes:

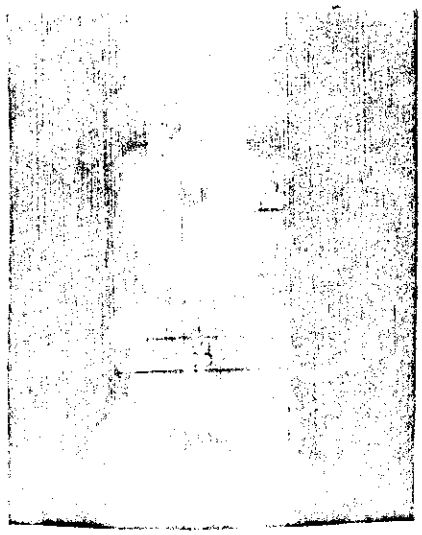
Level	Sex	Intercept		Ch. age		Weight		Height		F.value
		Constant	p	Coeff.	p	Coeff.	P	Coeff.	p	
L1	M	5.78822	> .05	0.02324	> .05	0.00816	> .05	0.08821	> .05	0.1036
	F	14.5294	< .05	0.01028	> .05	0.36733	> .05	0.0281	> .05	0.1186
L2	M	8.67306	> .05	0.02393	> .05	0.00364	> .05	0.07879	> .05	0.1083
	F	15.369	< .01	. 007400	> .05	0.03897	> .05	0.02658	> .05	0.0622
L3	M	9. 168400	> .05	0.01334	> .05	0.00781	> .05	0.08116	> .05	0.0917
	F	14.2489	< .01	0.00216	> .05	0.05145	< .05	0.03395	> .05	0.0063
L4	M	13.6805	> .05	. 020000	> .05	-0.00884	> .05	0.06342	> .05	0.4801
	F	19.0683	> .05	0.02211	> .05	0.01146	> .05	0.03843	> .05	0.8739
L5	M	7.72844	> .05	.064054*	> .05	0.05547	< .05	0.07986	> .05	0.0692
	F	17.9082	> .05	-0.02602	> .05	0.03775	> .05	0.05265	> .05	0.3061

Table (25):

Multiple Regression of A.P diameter with three variables (Age, weight & Height) at each level in both sexes:

Level	Sex	Intercept	Chronological		Weight		Height		F
			Coefficient	P	Coefficient	P	Coefficient	p	value
	M	12.587944	-0.002563	0.833	0.003955	0.843	0.033615	0.208	> .05
L1									
	F	3. 359100	0.004429	0.749	-0.003345	0.853	0.091325	0.005	< .05
	M	8.727299	-0.006388	. 6640	0.005441	0.821	0.050442	. 1190	> .05
L2									
	F	1.456466	0.010461	0.377	-0.00763	0.621	0.098075	6E-04	< .01
	M	7.379574	0.004472	0.735	-0.001685	0.938	0.05198	0.075	> .05
L3									
	F	0.502002	0.0011222	0.349	-0.024759	0.118	0.105102	3E-04	< .01
	M	6.649154	0.011358	0.431	-0.002389	0.919	0.05854	0.006	> .05
L4									
	F	-0.273115	0.009267	0. 4230	-0.032511	0.036	0.118905	. 0000	< .001
	M	6.364971	0.013138	0.369	0.001193	0.96	0.063849	. 0480	> .05
L5									
	F	0.934714	0.019533	0.186	-39409	0.044	0.116862	9E-04	< .01





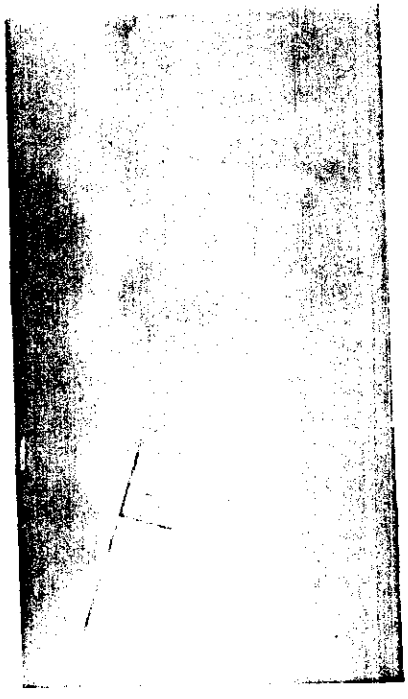
- A -

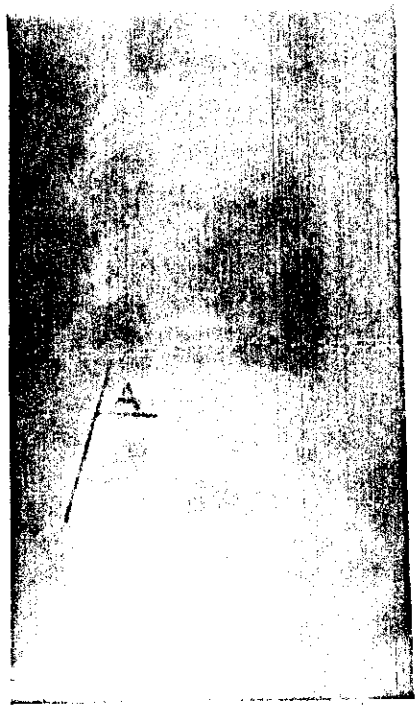
- B -

(Fig_15):-

Antero posterior view of the lumbar spine of a male (A) and a female (B) in the age group (20 - 30)

P: Pedicle thickness
B: Transverse diameter of vertebral body
T: Transverse diameter of the spinal canal .





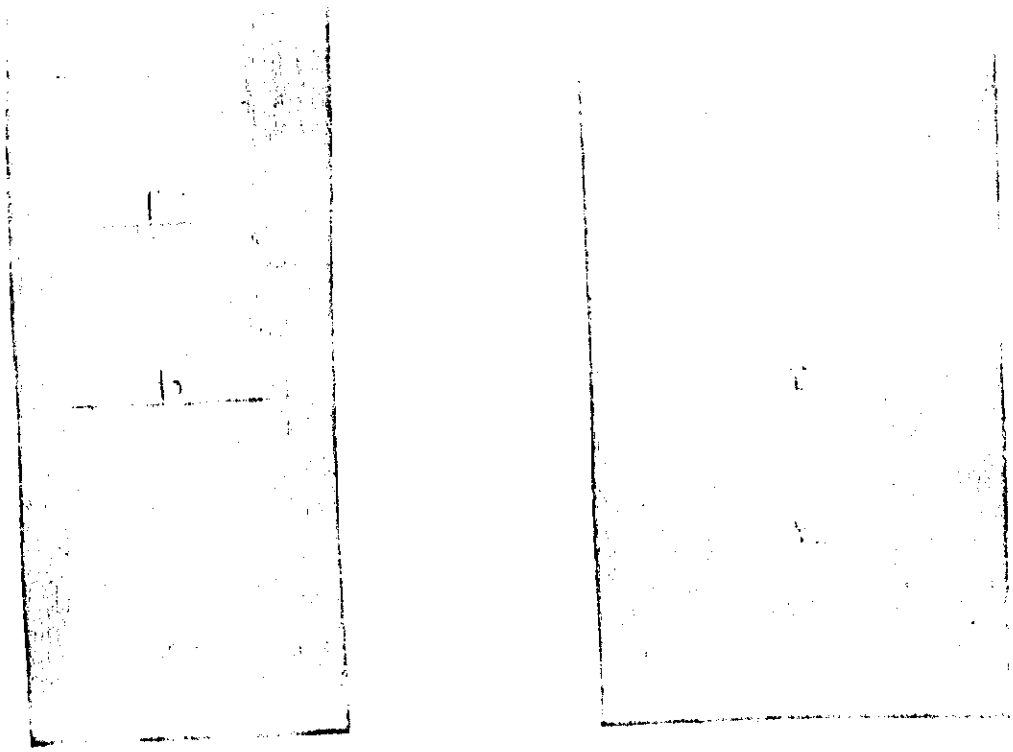
- A -

- B -

(Fig _ 24) :-

Lateral view of the lumbar spine of a male (A) and a female (B) in the age group (60 - 70).

A: Anteroposterior diameter of the canal.

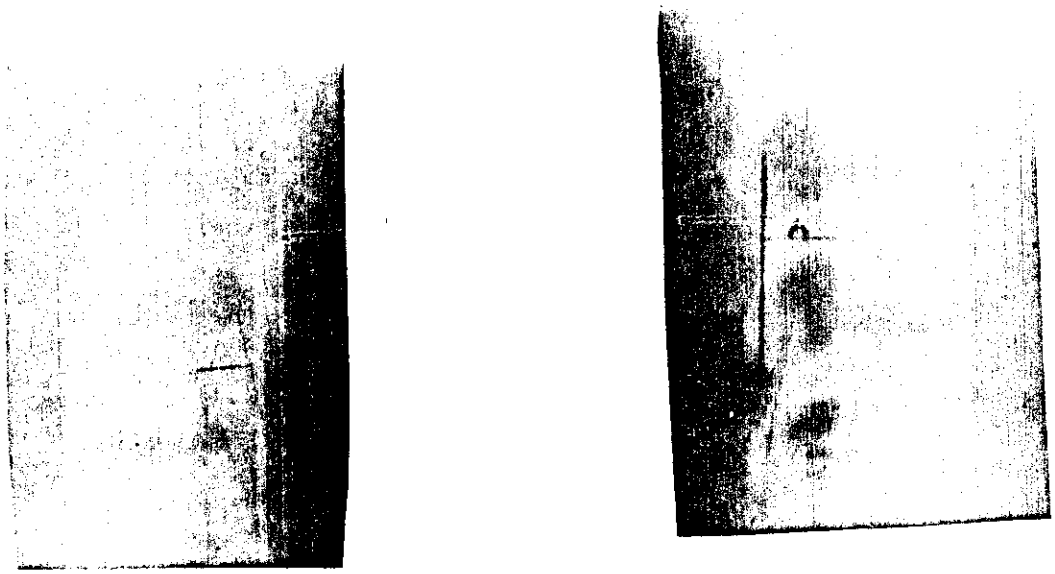


- A -

- B -

(Fig _ 23) :- **Antero posterior view of the lumbar spine of a male (A) and a female (B) in the age group (60 - 70).**

P: Pedicle thickness
B: Transverse diameter of vertebral body
T: Transverse diameter of the spinal canal .

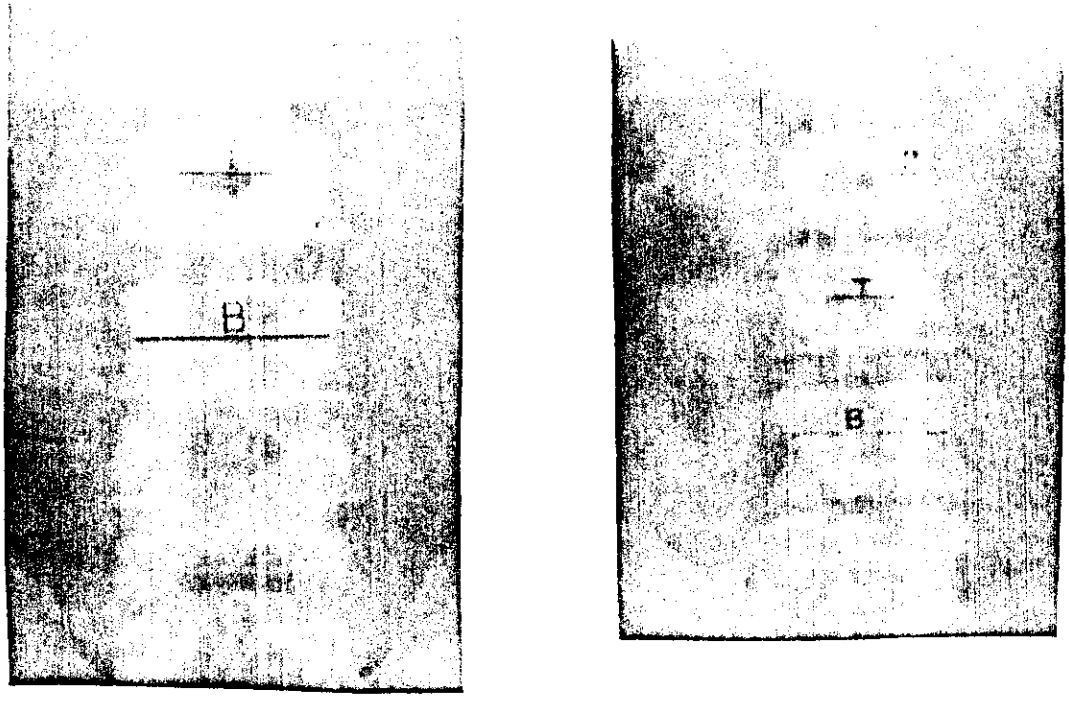


- A -

- B -

(Fig – 22) :- **Lateral view of the lumbar spine of a male (A) and a female (B) in the age group (50 - 60).**

A: Anteroposterior diameter of the canal.

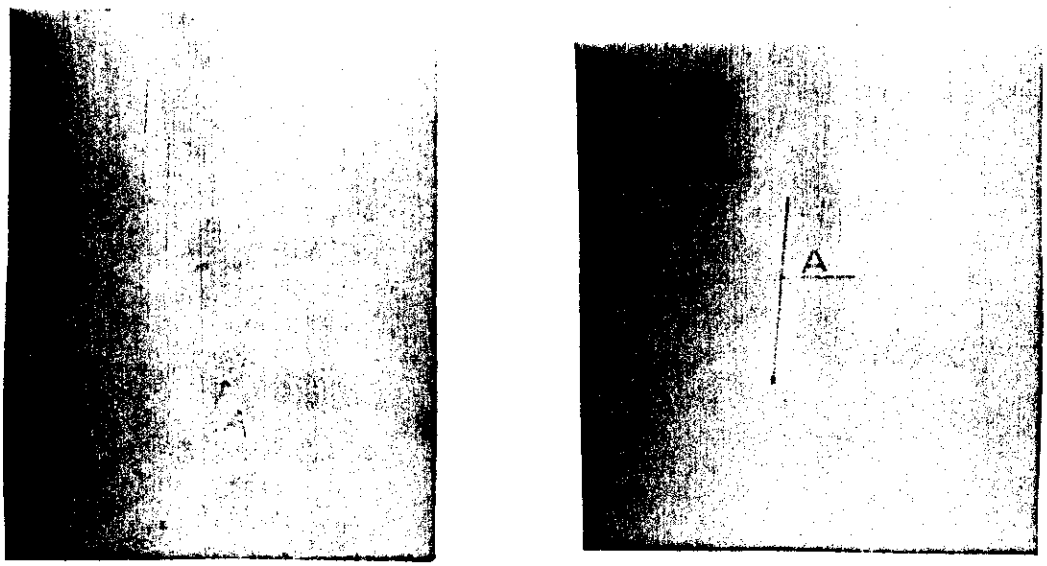


- A -

- B -

(Fig _ 21) :-
Antero posterior view of the lumbar spine of a male (A) and a female (B) in the age group (50 - 60).

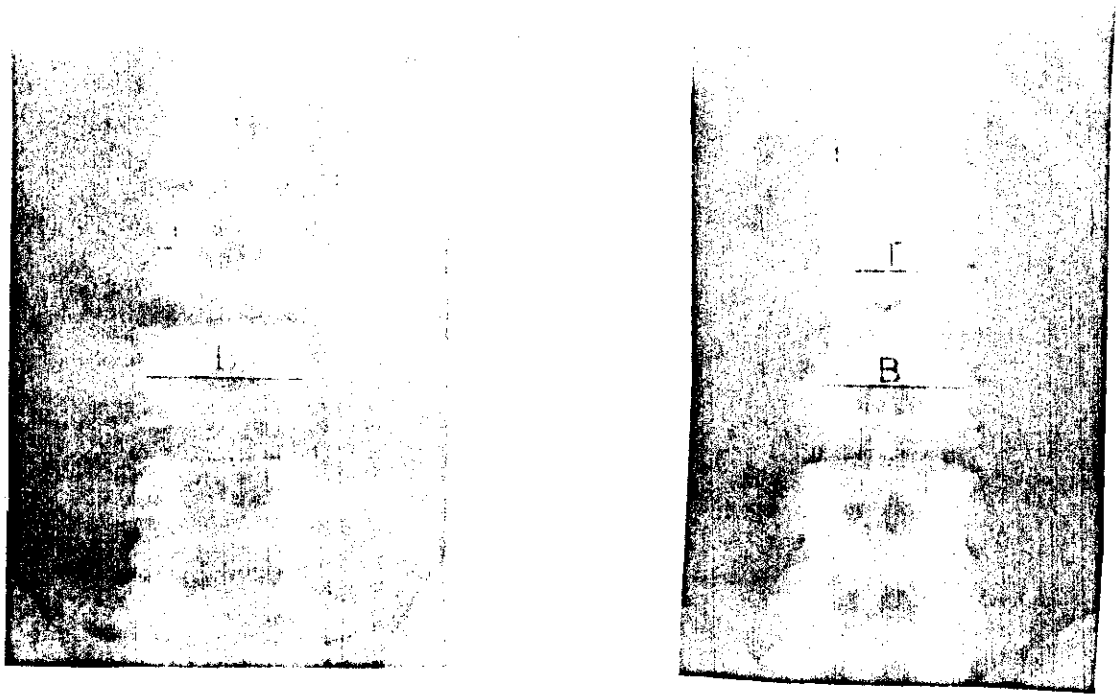
P: Pedicle thickness
B: Transverse diameter of vertebral body
T: Transverse diameter of the spinal canal .



- A -

- B -

(Fig _ 20) :-
Lateral view of the lumbar spine of a male (A) and a female (B) in the age group (40 - 50).
A: Anteroposterior diameter of the canal.

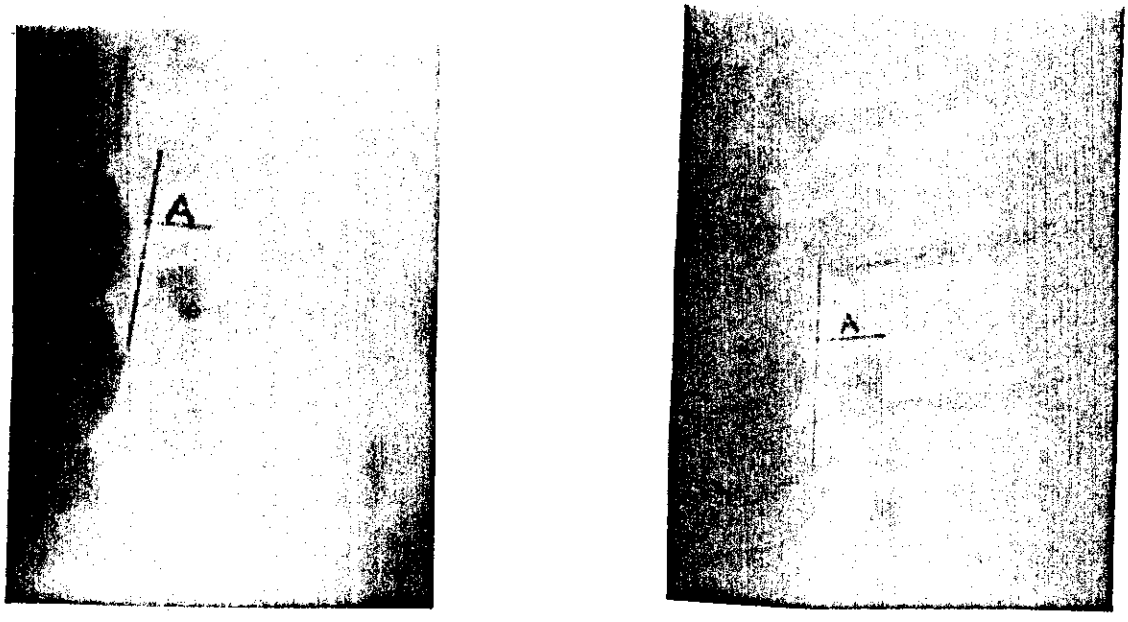


- A - **- B -**

(Fig –19) :-

Antero posterior view of the lumbar spine of a male (A) and a female (B) in the age group (40 - 50).

P: Pedicle thickness
B: Transverse diameter of vertebral body
T: Transverse diameter of the spinal canal .



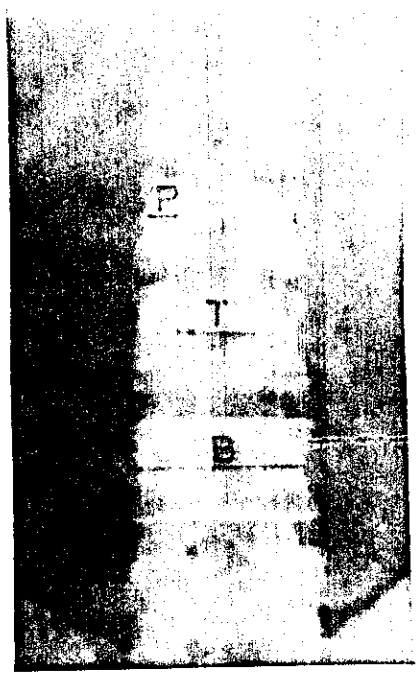
- A -

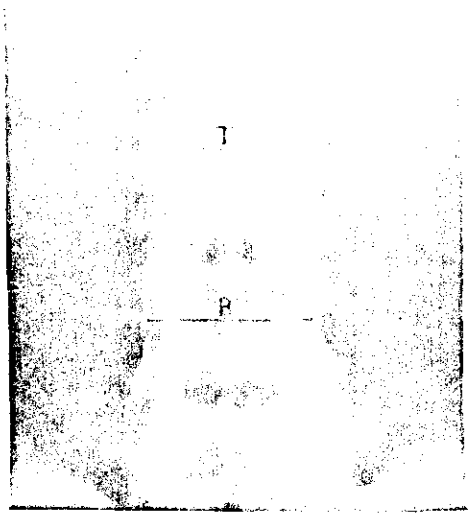
- B -

(Fig – 18) :-

Lateral view of the lumbar spine of a male (A) and a female (B) in the age group (30 - 40).

A: Anteroposterior diameter of the canal.





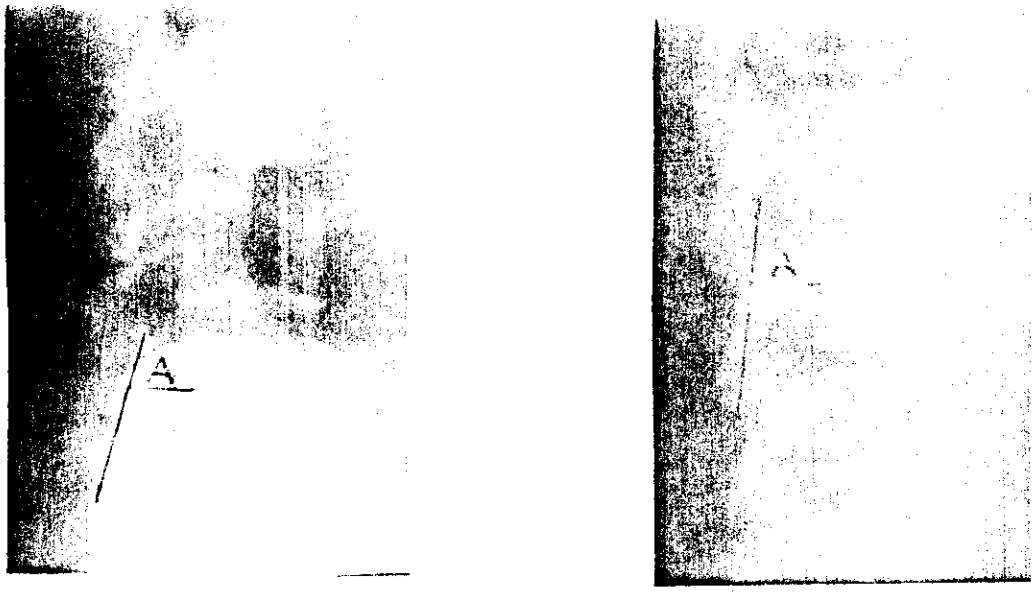
- A -

- B -

(Fig – 17) :-

Antero posterior view of the lumbar spine of a male (A) and a female (B) in the age group (30 - 40)

P: Pedicle thickness
B: Transverse diameter of vertebral body
T: Transverse diameter of the spinal canal .



- A -

- B -

(Fig -16_) :-

Lateral view of the lumbar spine of a male (A) and a female (B) in the age group (20 - 30).

A: Anteroposterior diameter of the canal.

CHAPTER (V)

- Discussion -