RESULTS

RESULTS

The results of the present study are summarized in the following tables (from 2-5) and figures (from 1-9).

- **Table (2):** and figure (1) show the mean value ± SD of urine pyrilink level in controls, post menopausal osteoporotics and pathological fractures.

- In control group the mean value ± SD of urine pyrilink level was 5.67 ± 1.12 nMDPD / mM creatinine and the range was (4-7.3 nMDPD/mM creatinine).
- In postmenopausal osteoporotic group the mean value ± SD of urine pyrilink level was 18.88 ± 12.95 nMDPD/mM creatinine and the range was (4.1-56.1 nMDPD/mM creatinine).
- In pathological fracture group the mean value ± SD of urine pyrilink level was 31.07 ± 29.45 nMDPD/mM creatinine and the range was (10.8-171.7. nMDPD/mM creatinine).
- There was a significant difference in urine pyrilink level between post- menopausal osteoporotic group and pathological fracture group at $p< 0.05$.
- Also the remarkable increase in urine pyrilink level was observed in pathological fracture group.

- **Table (3):** and figure (2) show the mean value ± SD of serum osteocalcin level in controls, post menopausal osteoporotic and pathological fractures groups.

- In control group the mean value ± SD of serum osteocalcin level was 5.92 ± 1.61 ng/ml and the range was (3.1-8.5 ng/ml).

- In post menopausal osteoporotic group the value ± SD of serum osteocalcin level was 11.84 ± 3.97 ng/ml. And the range was (3.1-18.1 ng/ml).

There was significant difference in serum osteocalcin level between control group and other two group, at $p< 0.001$ where as there was no significant difference in serum osteocalcin level between post menopausal osteoporotic group and pathological fracture group $p>0.05$.

- **Table (4):** and figure (3): show the mean value ± SD of serum alkaline phosphatase in control, post menopausal osteoporotic, and pathological fracture groups.

- In control group the mean value ± SD of serum alkaline phosphatase level was 54.95 ± 8.46 u/l and the range was (39-67 u/l).

- In post menopausal osteoporotic group the mean value ± SD of serum alkaline phosphatase level was 62.18 ± 9.74 u/L u/l and the range was (42-82 u/l).

- In pathological fracture group the mean value ± SD of serum alkaline phosphatase level was 88.59 ± 11.23 and the range was (60-107 u/l)

There was a significant difference in serum alkaline phosphatase level between control and there two groups and there was a significant difference between postmenopausal osteoporotic and pathological fracture groups. $p< 0.001$.

The increase in serum alkaline phosphatase level was observed in pathological fracture group.

☞ **Table (5)** and figure (4): show the mean value ± SD of urine calcium level in control, post menopausal osteoporotic and pathological fracture groups.

- In control group the mean value ± SD of urine calcium level was 173.60 ± 28.95 mg/day and the range was (120-232 mg/day).
- In post menopausal osteoporotic group the mean value ± SD of urine calcium level was 168.60 ± 36.11 mg/day and the range was (104-232 mg/day).
- In pathological fracture group the mean value ± SD of urine calcium level was 147.56 ± 33.8 mg/day and the range was (104-216 mg/day).

There was no significant difference between the control group and other two group $P>0.05$. Whereas there was a significant difference between post menopausal osteoporotic group and pathological fracture group $P< 0.05$.

In postmenopausal osteoprotic group there was:

A significant positive correlation between urine pyrilink level and serum osteocalcin level at $r^2 = 0.1011$, $y = 0.0958x + 10.034$ and $p<0.001$.

The results of the present study revealed that: the marked increase in urine pyrilink level and the increase in serum osteocalcin level were observed in postmenopausal osteoporotic and pathological fracture groups.

The parameters that indicate bone turnover (urine calcium and serum ALP) showed no significant difference in their levels between control, postmenopausal osteoporotic and pathological fracture groups.

- **Fig (5):** show significant positive correlation between urine pyrilink and serum osteocalcin in osteoporotic group at $r^2 = 0.1011$ and $p<0.001$.

- **Fig (6):** showes no significant correlation between urine pyrilink and ALP in osteoporotic group.
- **Fig (7):** showes no significant correlation between urine pyrilink and ALP in pathological fracture group.
- **Fig (8):** showes no significant correlation between urine pyrilink and urine calcium in osteoporotic group.
- **Fig (9):** showes no significant correlation between urine pyrilink and urine calcium in pathological fracture group.

Table (2): Comparison between the studied groups as regard urine pyrilink (nmol DPD/ mmol creatinine).

	(I) Controls n=20	(II) Osteoporosis N=40	(III) Path. Fracture n=27
Range	4-7.3	4.1-56.1	10.8-17.17
Mean	5.67	18.88	31.07
± SD	1.12	12.95	29.45
t1 (Ivs. II)	6.40		
P	<0.001*		
t2 (Ivs. III)	3.97		
P	<0.001*		
t3 (IIvs. III)	1.92		
P	<0.05*		

*Significant

Fig (1): Urine pyrilink in the studied groups (n mol DPD / mmol creatinine)

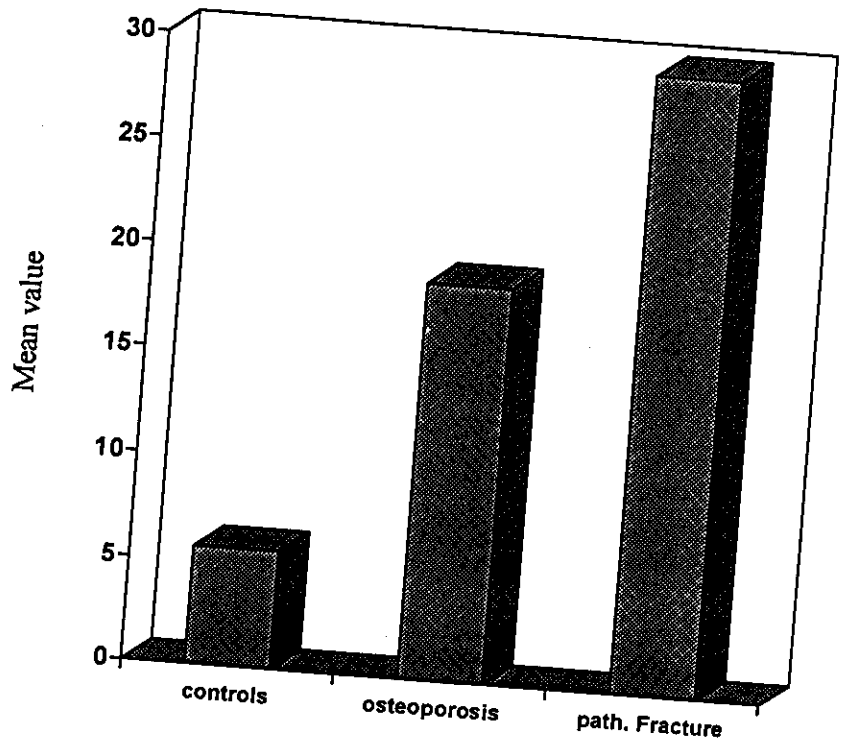


Table (3): Comparison between the studied groups as regards serum osteocalcin, ng/ml

	(I) Controls n=20	(II) Osteoporosis n=40	(III) Path. Fracture n=27
Range	3.1-8.5	3.1-17.2	3.1-18.1
Mean	5.92	11.84	12.19
± SD	1.16	3.90	3.97
t1 (Ivs. II)	8.28		
P	<0.001*		
t1	7.42		
P	<0.001*		
t3	0.35		
P	>.005		

*Significant

Fig (2): Serum Osteocalcin in the studies groups (ng/ml).

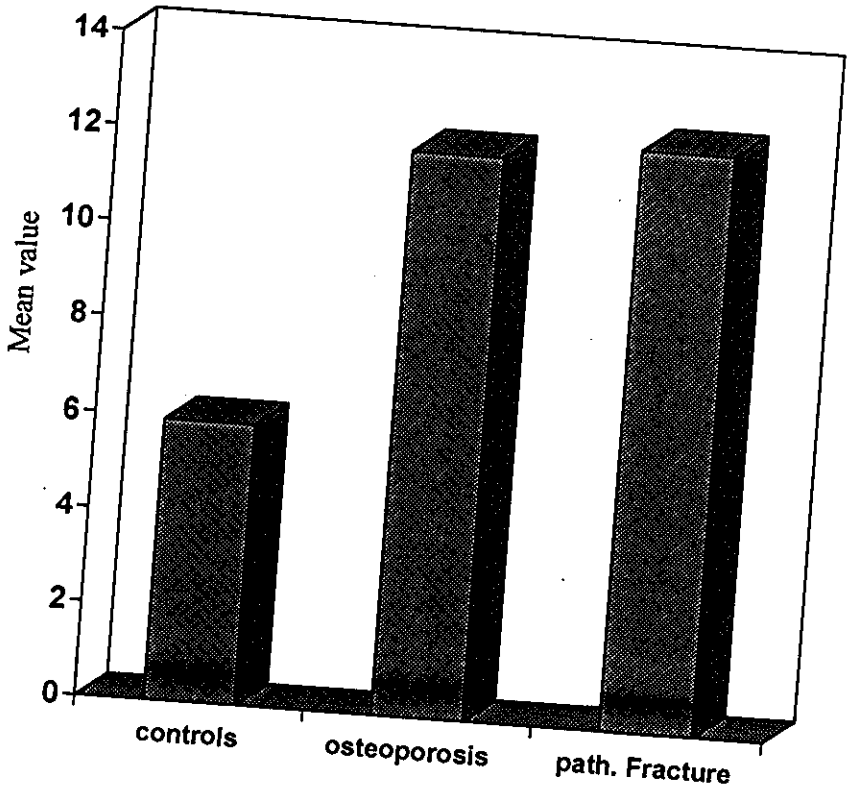


Table (4): Comparison between the studied groups as regards serum alkaline phosphatase. (u/l)

	(I) Controls n=20	(II) Osteoporosis N=40	(III) Path. Fracture n=27
Range	39-67	42-82	60-107
Mean	45.95	62.18	88.59
± SD	8.46	9.74	11.23
t1 (Ivs. II)	2.83		
P	<0.01*		
t2 (Ivs. III)	11.12		
P	<0.001*		
t_3 (IIvs. III)	10.24		
P	<0.001*		

*Significant

Fig (3): Serum Alkaline phosphatase in the studied groups (u/l).

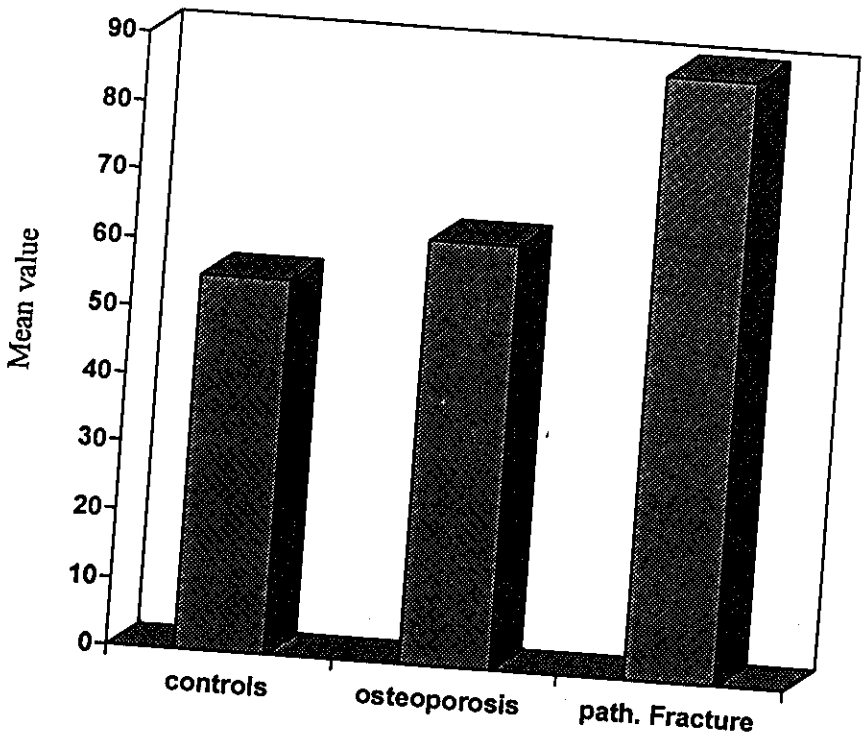
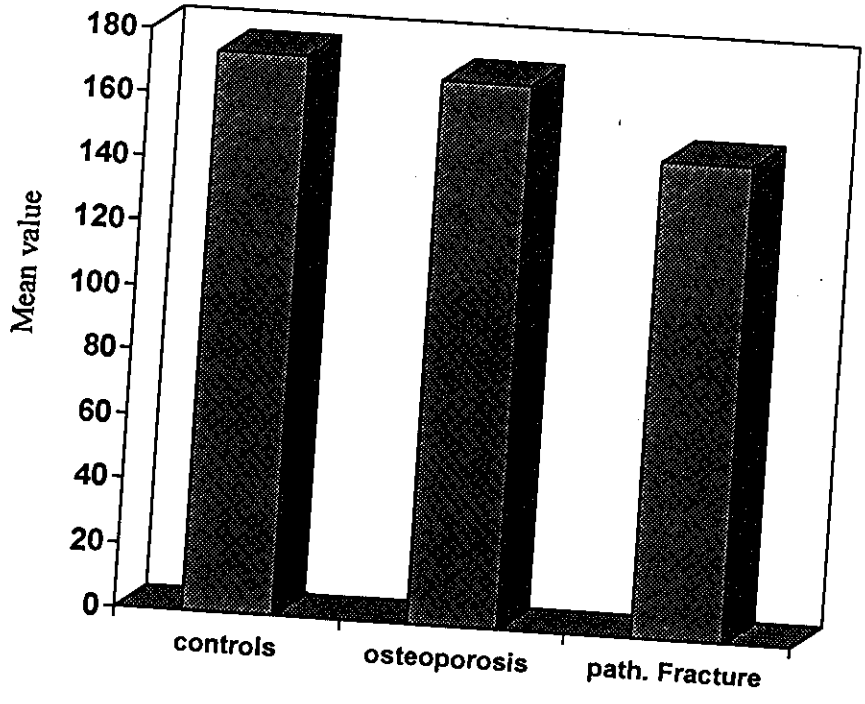


Table (5): Comparison between the studied groups as regards urine calcium (mg/ day)

	(I) Controls n=20	(II) Osteoporosis n=40	(III) Path. Fracture n=27
Range	120-232	104-232	104-216
Mean	173.60	168.60	147.56
± SD	28.95	36.11	33.08
t1 (Ivs. II)	0.54		
P	>0.05		
t2 (Ivs. III)	2.81		
P	<0.01*		
t_3 (IIvs. III)	2.42		
P	<0.05*		

*Significant

Fig (4): Urine Ca in the studies groups mg/day



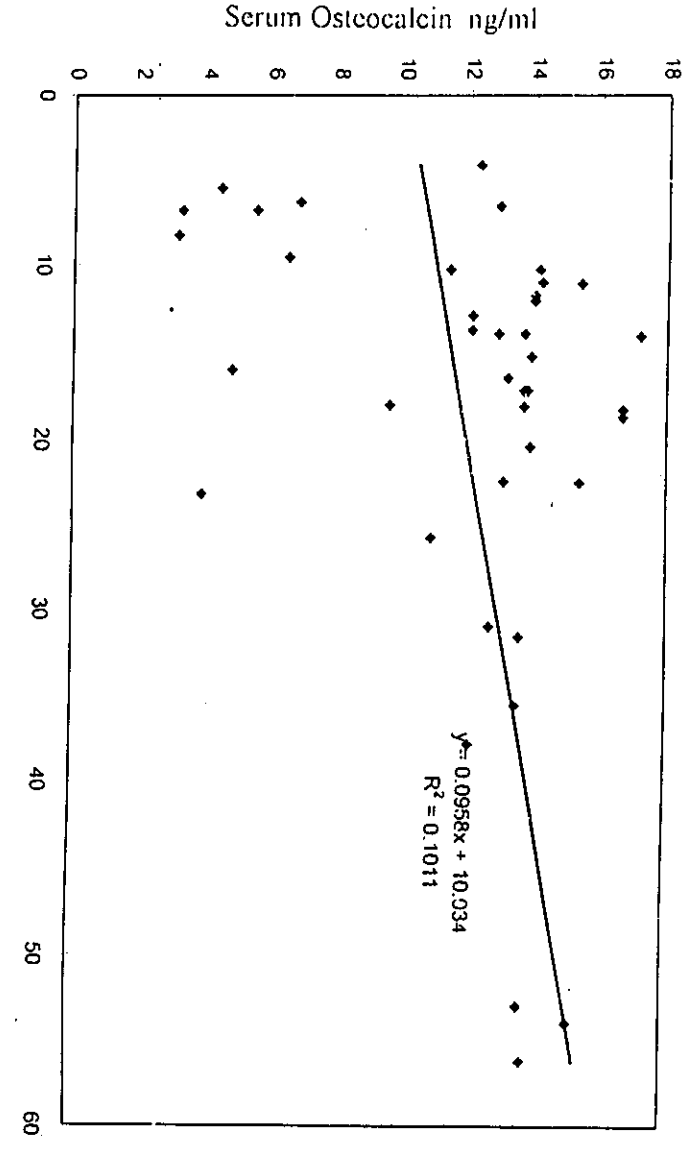


Fig (5): Correlation between urine pyrilink and serum osteocalcin in osteoporotic group

Fig. (6): Correlation between urine pyrilink and serum ALP in osteoporotic group.

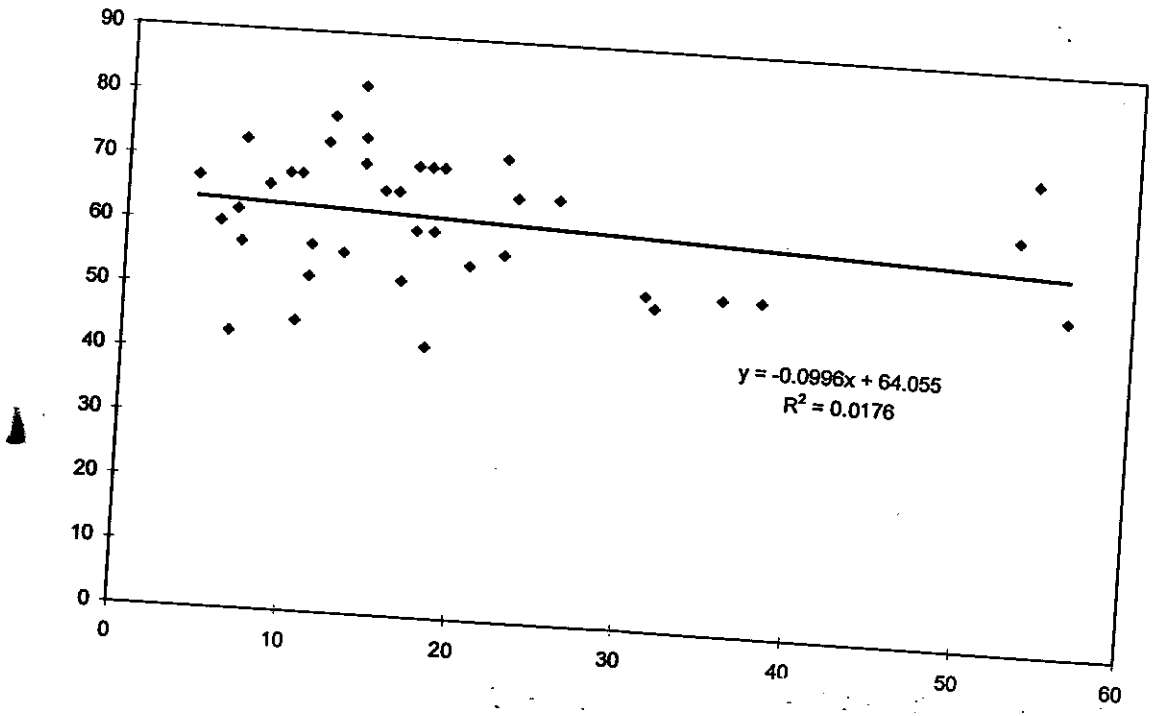


Fig. (7): Correlation between urine pyrilink and serum ALP in pathological fracture group.

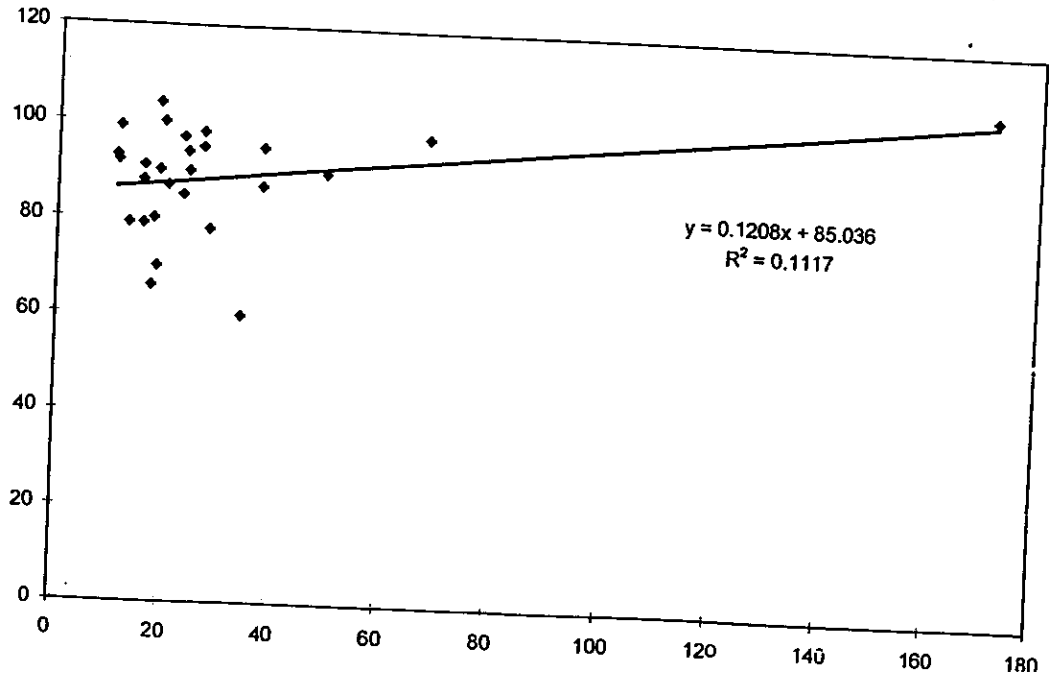


Fig. (8): Correlation between urine pyrilink and urine calcuim in osteoporotic group.

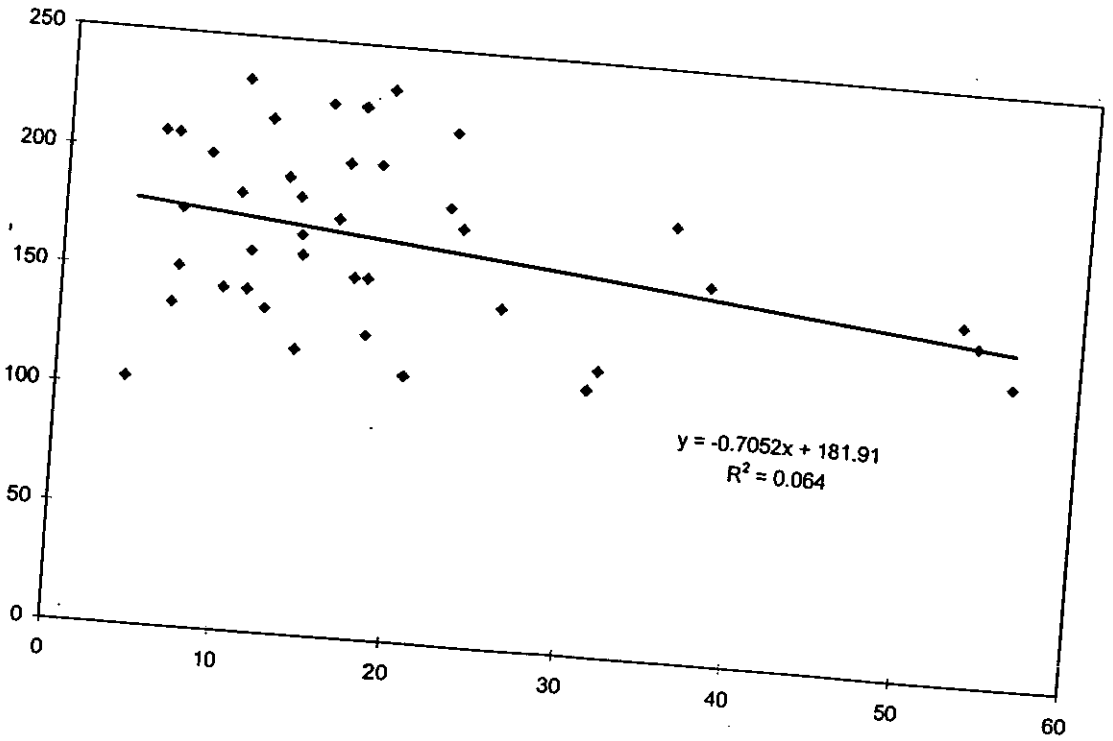
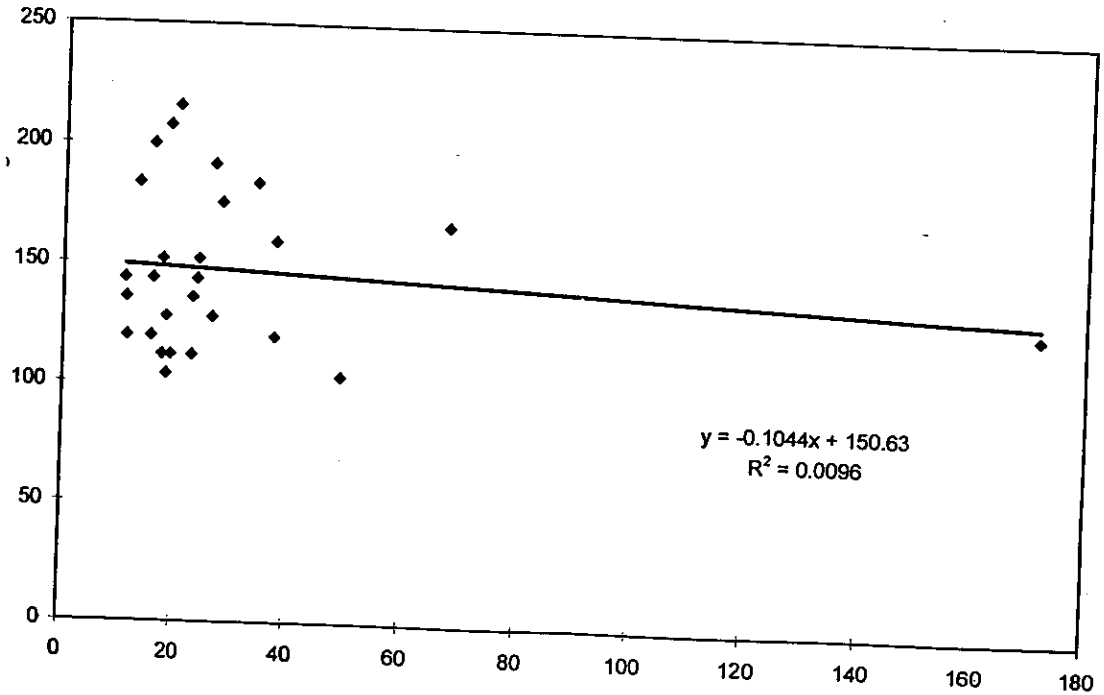


Fig. (9): Correlation between urine pyrilink and urine calcuim in pathological fracture group.



Control group post menopausal without Symptoms

No	Age	Menopausal Age	INR	F.B.S mg/dl	Creatinine mg/dl	Alkaline. Ph. u/l	Albumin g/dl	Protein g/dl	Ca in urine mg/day	Osteocalcin ng/ml	Pyrilink nM/mM
1	53	2 years	1.1	68	1	60	4.2	6.2	120	3.1	6.2
2	55	4 years	1	70	0.9	66	4.2	7.2	149	7.2	4.1
3	55	4 years	1	99	0.6	50	404	7.1	144	7.2	7
4	58	4 years	1	75	0.6	45	3.9	6.6	160	7.9	7.3
5	55	5 years	1.2	90	1	67	4.3	7.4	152	5.9	4.2
6	52	2 years	1	88	1	55	4.5	7	232	5.5	5.6
7	50	1 years	1	100	0.9	49	4.7	6.8	176	5.6	5.
8	52	2 years	1.1	105	1.1	39	4.8	7	136	7.9	4.4
9	50	1 years	1.2	70	1.2	45	4.7	7	144	6	5.4
10	51	1 yers	1	77	0.9	60	4.6	7.2	182	3.8	4.2
11	51	1 years	1	100	0.6	55	4.2	7	208	6.1	6.2
12	52	2 years	1	90	1.1	65	4.5	6.7	192	8.5	6.8
13	55	3years	1.1	105	0.7	59	4.5	7.2	200	3	6.2
14	50	3 years	1.1	99	0.9	56	4.65	7.3	184	5\	7.2
15	55	2 years	1	70	0.6	47	4.2	6.9	192	4.4	5.8
16	51	1 years	1	77	1	65	4.5	7.1	168	5.9	4.7
17	52	2years	1.1	60	1.1	45	4.5	7	208	8.5	4
18	48	1 years	1	80	0.7	50	4.5	6.6	184	5.4	6.3
19	56	3 years	1.1	90	1.2	55	3.7	7.4	152	7.8	6.5
20	50	3 years	1.1	88	0.9	66	4.3	7	144	5.7	6.9

INR : International Normalization Ratio of prothrombin activity

Postmenopausal osteoporotic group

No	Age	Menopausal Age	INR	F.B.S Mg/dl	Creatinine Mg/dl	Alkaline. Ph. u/l	Albumin g/dl	Protein g/dl	Ca in urine mg/day	Osteocalcin ng/ml	Pynlink nm/mm
21	65	10 years	1	100	1.2	67	4	6	104	12.3	4.1
22	60	10 years	1	90	1.2	66	4.4	6	144	10.6	25.6
23	58	8 years	1.1	80	0.9	74	4.5	7.1	120	13.t	13.9
24	54	3 years	1.1	100	1.1	55	4.8	7.3	112	13.9	20.3
25	50	1 years	1	98	1	57	4.2	6.2	160	15.4	11
26	65	13 years	1	103	1	70	3.9	6	168	12.9	13.9
27	55	5 years	1.2	66	0.6	52	3.9	6.8	200	13.2	16.4
28	60	2 years	1.1	76	1.2	62	4.2	7	136	12.9	6.5
29	51	8 years	1.1	90	0.6	73	4.1	6.9	144	15.2	53.9
30	59	3 years	1	105	0.6	72	3.9	6	184	13.1	22.3
31	50	2 years	1	87	0.8	70	4.1	6.8	152	13.8	17.1
32	74	20 years	1.1	70	0.7	66	3.7	6	176	3.9	23.1
33	63	10 years	1.2	70	1.2	77	4.3	6.8	136	14	12
34	54	4 years	1	85	1.1	82	4	6.4	184	12.1	13.7
35	50	1 years	1	108	0.6	52	4	6.9	128	13.8	56.1
36	55	5 years	1	108	0.8	66	4.5	6.1	224	13.8	15.2
37	54	4 years	1	108	0.7	70	3.8	6.8	232	16.7	18.6
38	60	10 years	1.1	66	1.2	42	4.2	6.5	128	13.7	18
39	60	23 years	1.1	90	1.1	52	4	6.5	160	12.1	37.8
40	60	10 years	1	70	0.6	57	3.9	6.2	216	15.4	22.4
41	50	2 years	1	85	0.6	66	4.2	6	176	4.8	16

No	Age	Menopausal Age	INR	F.B.S mg/dl	Creatinine Mg/dl	Alkaline. Ph. u/l	Albumin g/dl	Protein g/dl	Ca in urine mg/day	Osteocalcin ng/ml	Pyrilink nm/mm
42	55	5 years	1.1	112	1	60	4.1	7.4	200	16.7	18.2
43	56	5 years	1	96	1	52	4.5	7	112	12.7	30.9
44	55	4 years	1.1	100	1	52	3.9	7	184	13.5	35.5
45	50	3 years	1	77	0.9	60	4.5	6	224	13.7	17.1
46	56	6 years	1	70	0.9	43	4	7	208	6.8	6.3
47	56	2 years	1	110	1	70	4	6	152	9.6	17.9
48	60	6 years	1	99	0.9	66	3.5	6.2	200	3.1	8.3
49	65	2 years	1	100	1.2	70	4.3	6.5	160	17.2	14
50	53	5 years	1.1	105	0.9	50	4	6.2	120	13.6	31.5
51	62	15 years	1	90	0.9	73	3.9	6.5	152	5.2	6.8
52	55	1 years	1.1	66	1.2	52	4.2	6.7	144	14.2	10.8
53	58	10 years	1	60	1.1	45	3.9	6	232	14.1	10.2
54	57	5 years	1.1	77	1	57	4.5	6.3	176	3.2	6.8
55	55	5 years	1.2	85	0.9	60	3.9	7.1	208	4.4	5.5
56	59	3 years	1	99	0.9	56	3.7	6.7	192	12.1	12.9
57	60	4 years	1	66	1.2	68	4.2	6	184	11.4	10.2
58	54	7 years	1	105	1	73	3.9	6.1	216	14	11.7
59	57	5 years	1	100	1.1	68	3.8	6	144	6.5	9.5
60	56	5 years	1.2	107	1	64	4	6	152	13.7	52.9

DISCUSSION

Bone is constantly undergoing a metabolic process called remodeling. This includes a degradation process, bone resorption, mediated by the action of osteoclasts, and a building process, bone formation, mediated by the action of osteoblasts *(Delmas, 1995)*.

Remodeling is required for the maintenance and over all health of bone and is tightly coupled, that is resorption and formation are in balance. In abnormal states of bone metabolism, this process becomes uncoupled and when resorption exceeds formation, this results in a net loss of bone *(Riggs, 1991)*.

Osteoporosis is a metabolic bone disease characterized by abnormal bone remodeling. It is a systemic skeletal disease characterized by low bone mass and microarchitectural deterioration of bone tissue, with a consequent increase in susceptibility to fractures. The most common type of osteoporosis occurs in post menopausal women as a result of the estrogen deficiency produced by the cessation of ovarian function *(Eastell et al., 1997)*.

Osteoporosis can also result from attaining an inadequate peak bone mass during the growing years, an age related imbalance of bone remodeling with a net excess of resorption, and a number of clinical conditions and therapies which induce bone loss or bone remodeling imbalances, these include endocrine disease such as hypogonadism, hyperthyroidism, hyperparathyrodism, gastrointestinal diseases related to nutrition and mineral metabolism, connective tissue disease, multiple myeloma, chronic immobilization, alcoholism, or tobacco use and chronic therapy with heparin or corticosteroids. Other diseases characterized by