

OSTEOPOROSIS PREMENOPÁUSICA

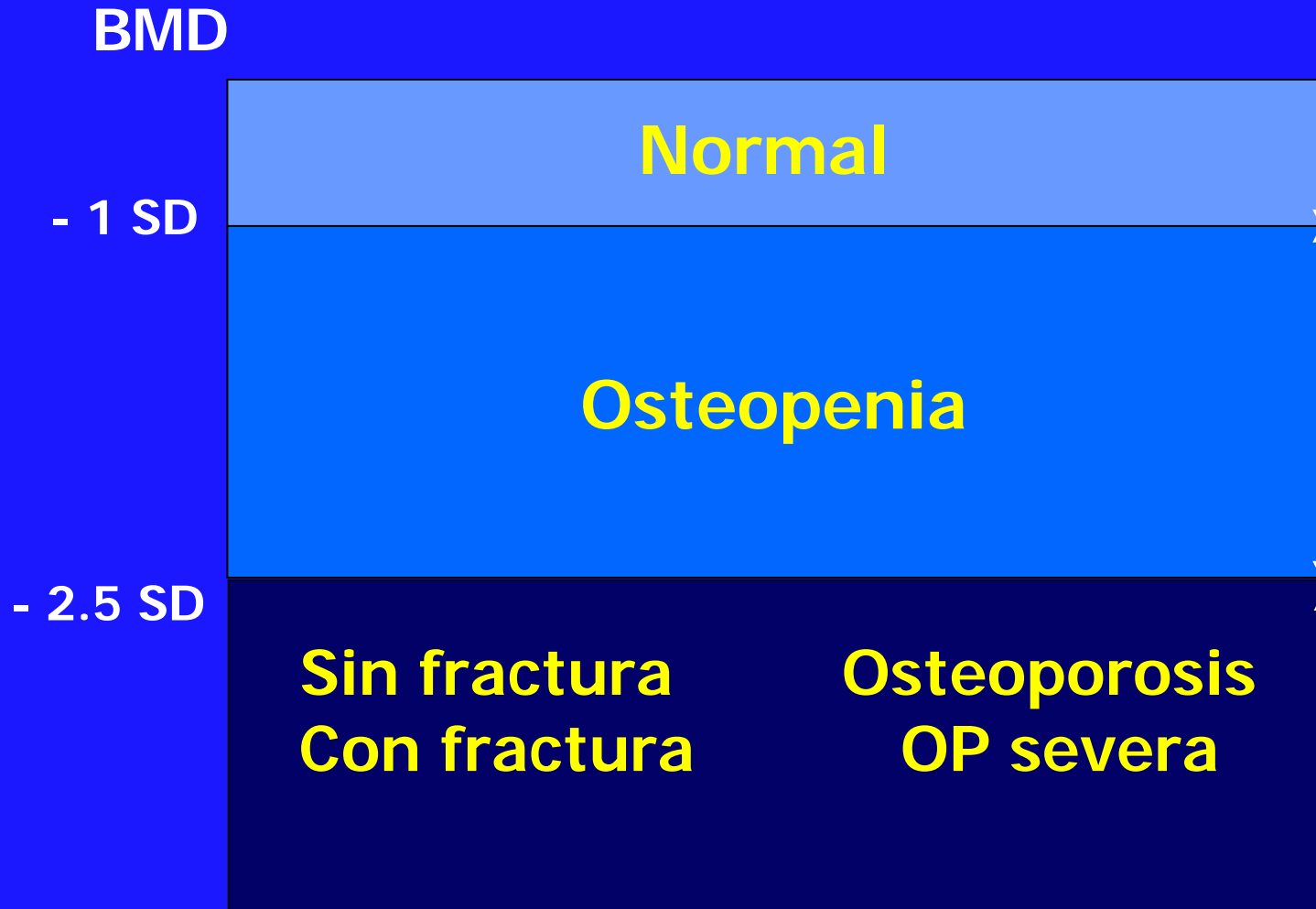
Ramón Pérez Cano
H.U. Virgen Macarena-Sevilla

Osteoporosis

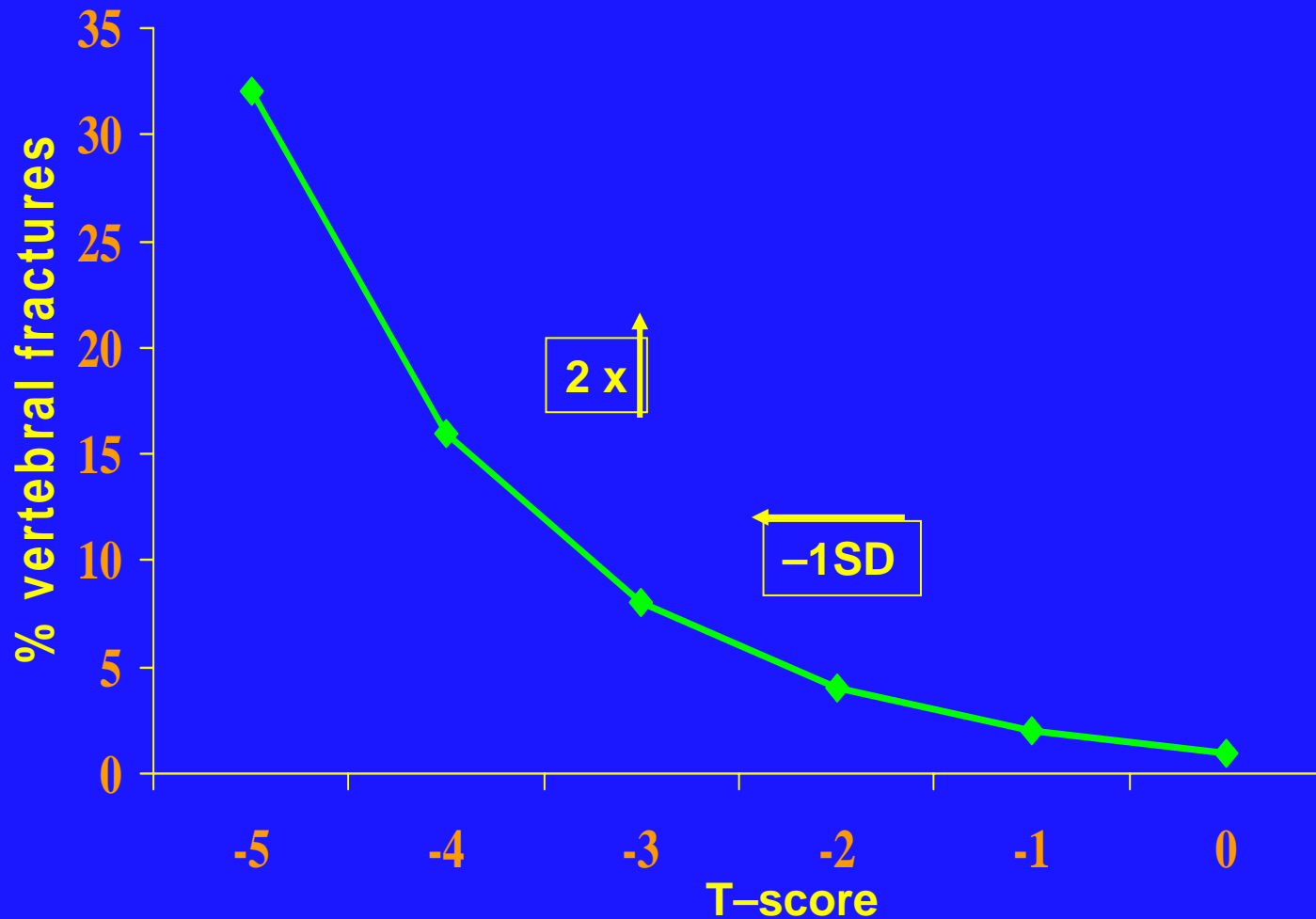
- Enfermedad esquelética sistémica que se caracteriza por:

- Masa ósea baja.
- Deterioro de la microarquitectura del tejido óseo.
- Aumento de la fragilidad ósea y propensión a las fracturas.

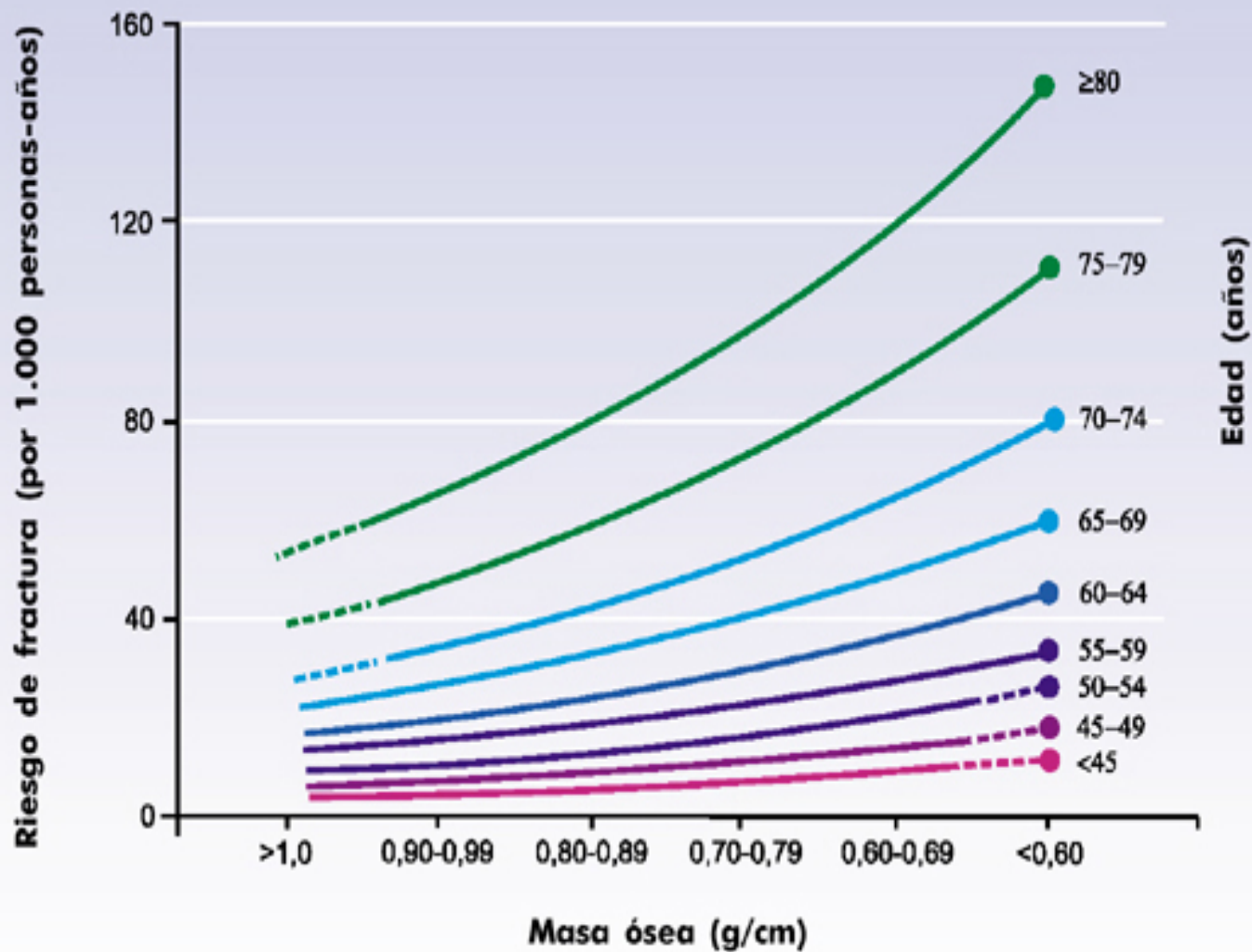
Osteoporosis



La DMO es un buen indicador del riesgo de fractura



Riesgo de fractura, masa ósea y edad



Diagnóstico de OP Premenopáusica

- No sirven los criterios densitométricos señalados (OMS) para la mujer postmenopáusica, ya que a igualdad de masa ósea el riesgo de la mujer premenopáusica es mucho menor.
- Una masa ósea menor en la juventud puede ser la consecuencia de:
 - a) un menor volumen corporal, con microarquitectura y resistencia normales.
 - b) un menor “pico de masa ósea”, por genética y/o alteraciones durante la infancia y adolescencia.
 - c) una pérdida posterior, con alteración de la estructura y disminución de la resistencia.

Diag. de OP Premenopáusica

- No debe utilizarse el T-score ni hablar de Osteopenia cuando nos referimos a la mujer premenopáusica.
- Se debe utilizar la “Z” en vez de la “T”, ya que la Z compara con el grupo de mujeres de su edad y no con la población “pico”.
- Existe consenso en denominar:
 - “Z” < -2: “ menor de la esperada para su edad”. (Baja).
 - “Z” > -2: “ dentro de lo esperado para su edad”.

Diagnóstico de OP en la premenopáusia

- **Sólo puede hacerse con seguridad el diagnóstico de OP en la mujer premenopáusica ante la presencia de fractura espontánea o con trauma de poca intensidad.**
- **Si no existe fractura, además de valorar el nivel de masa ósea baja ($Z < -2$), hay que exigir la presencia concomitante de factores que aumentan el riesgo, como antecedentes familiares y/o personales de fracturas y/o la presencia de causas de osteoporosis secundarias.**

Causas de OP premenopáusica

Secundarias (50-90 %):

- Hipogonadismo, S. Cushing, Hipertiroidismo, DM-1, Hiperparatiroidismo, Hipercalciuria, Embarazo y lactancia.
- Anorexia Nerviosa y Depresión.
- Enf. Hepática y gastrointestinal (EII, Malabsorción..)
- Conectivopatías: O.Imperfecta, Marfan, Ehlers-Danlos, Artritis reumatoide, LES, Espondilitis anquilosante.
- Medicación: Corticoides, anticonvulsivantes, inmunosupresores, heparina, quimioterapia, Gn agonistas, Glitazonas, Litio...
- Trasplantes
- Enfermedades médula ósea: Leucosis, Linfomas, Mielomas...

Idiopáticas (10-50 %) – 0.5/100.000/año.

Causas de OP en mujeres premenopáusicas (N=61)

Causa	N	%
Idiopática	24	39
Amenorrea > 6 meses	21	34
Anorexia Nerviosa	(10)	(16)
Trat. Corticoideo	8	13
Enf. Celiaca	6	10
Enf. Reumatológica	3	5
Trasplante órganos	3	5
Hiperparatiroidismo	3	5
Hipertiroidismo	1	2

Mujeres premenopáusicas enviadas a una Unidad de Metabolismo Óseo (H.U.V.M.-Sevilla)

Muestra total de mujeres: 91.5% Postmenopáusicas
8.5% Premenopáusicas
(edad media: 42 años)

DMO: Normal: 40.7%

T entre -1 y -2.5 : 46.3%

T < -2.5: 13%

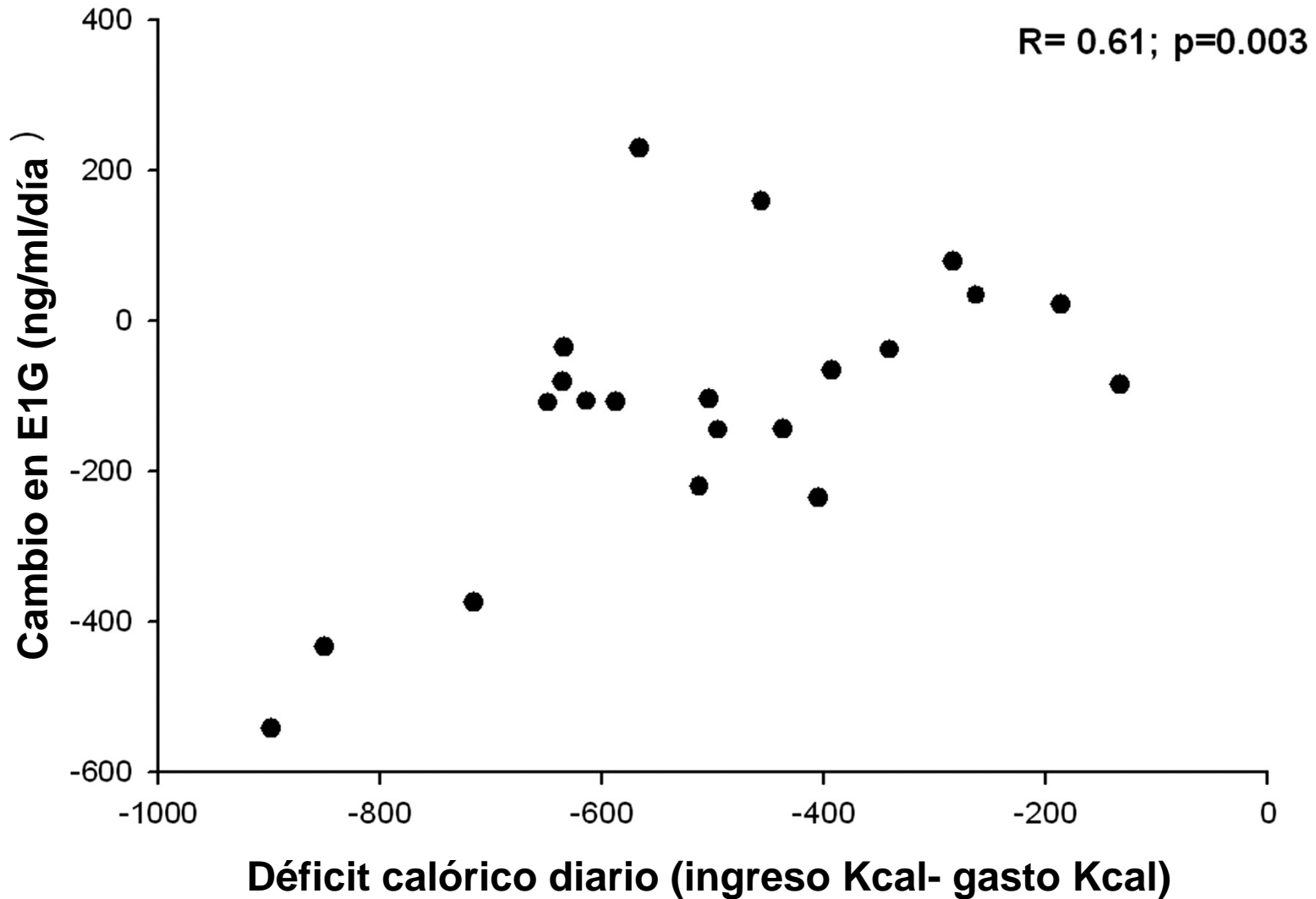
DMO: Z < -2: 23.5% y Fx el 20% (Corticoides, Hipogonadismo, Hipercalciuria, malabsorción, anorexia nerviosa y embarazo-lactancia).

En una población general, no seleccionada, hay un 15% con T < -1 y un 0.5% con T < -2.5.

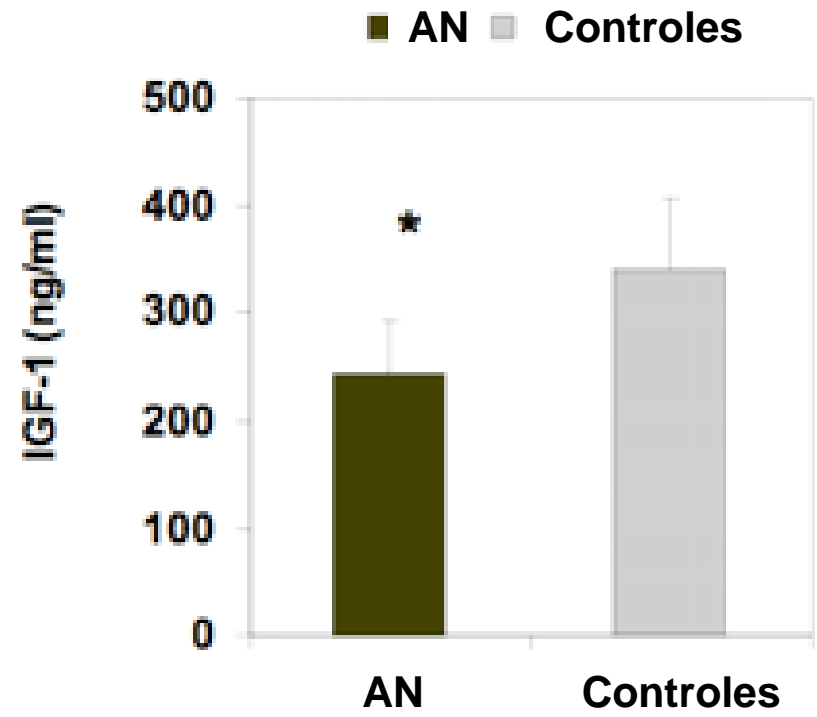
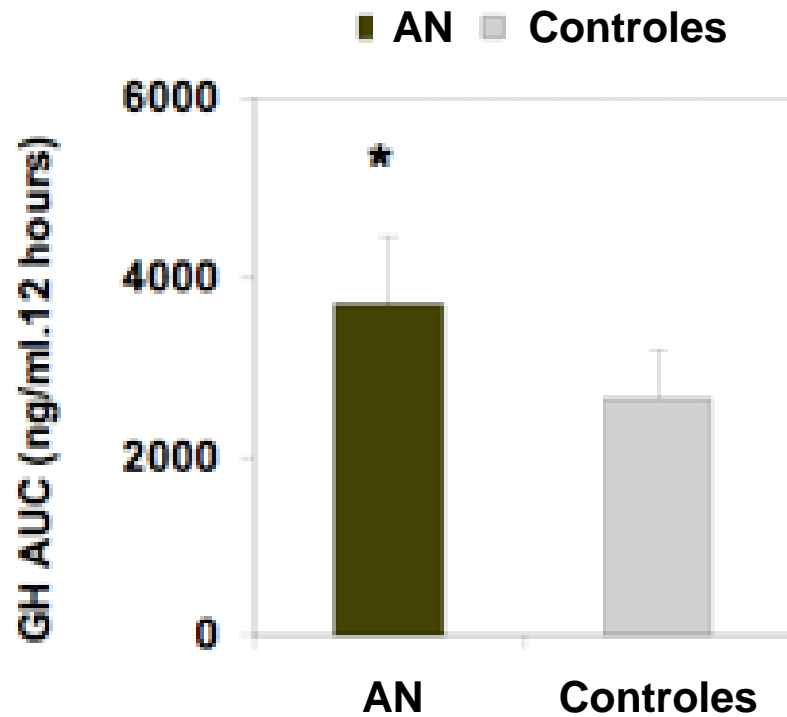
Anorexia Nerviosa

- Imagen distorsionada de sí misma, con temor intenso a ganar peso.
- Alteración nutricional, con un peso menor al 85% del esperado.
- Falta de 3 menstruaciones consecutivas.
- 0.5% de mujeres y 15-62% en atletas.
- Frecuencia mucho menor en varones.

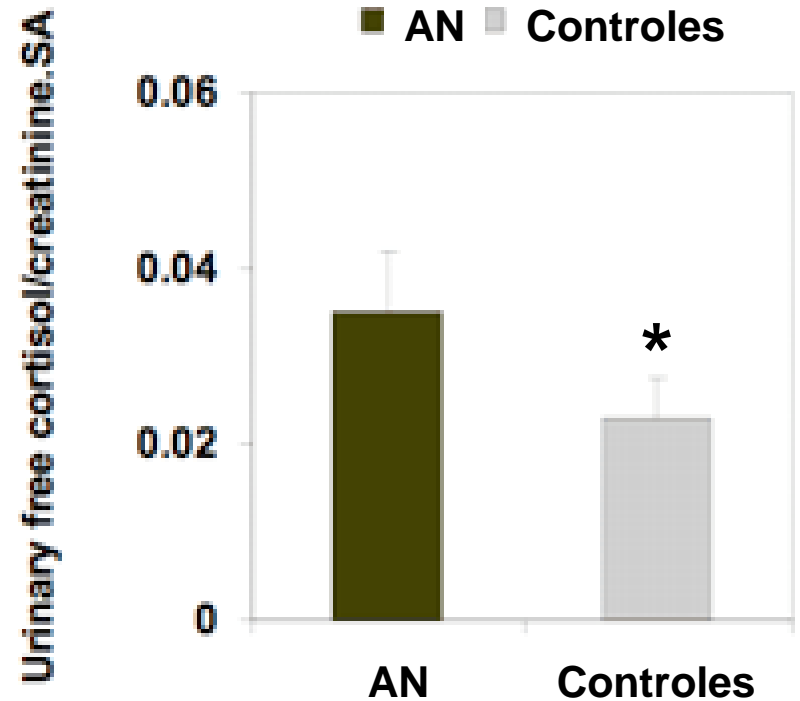
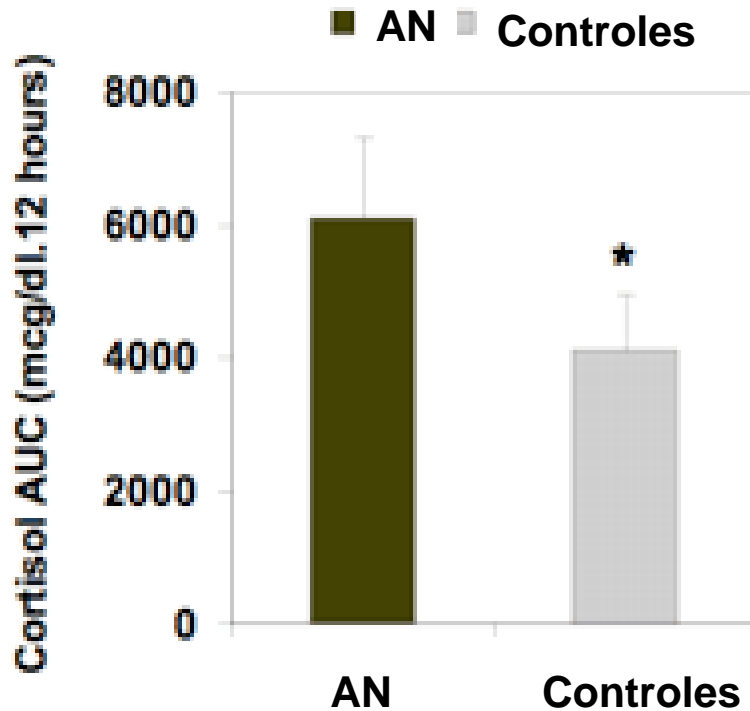
Correlación entre déficit de ingesta calórica y estrógenos en mujeres premenopáusicas



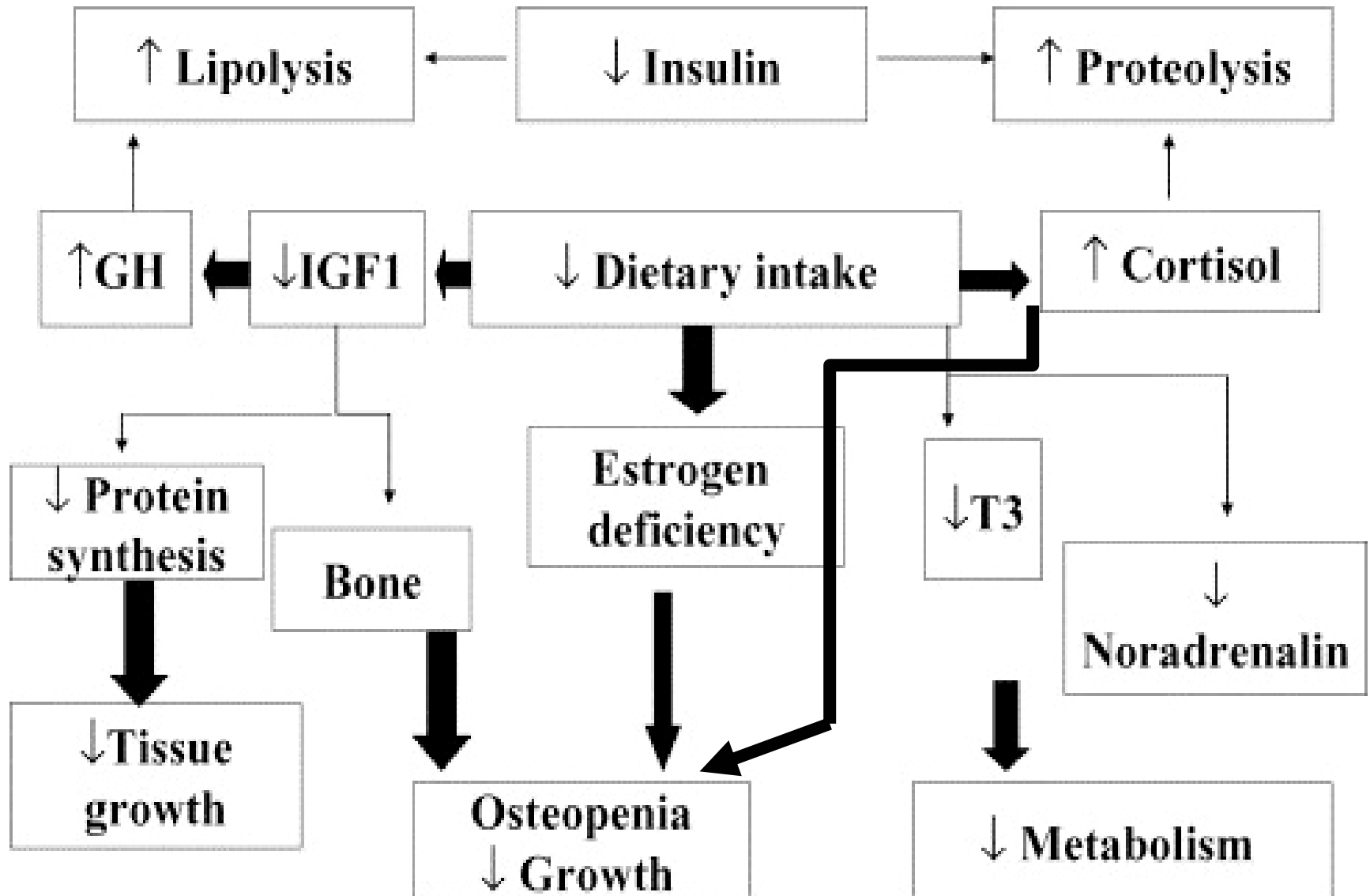
Niveles de IGF-1 y GH en Anorexia Nerviosa



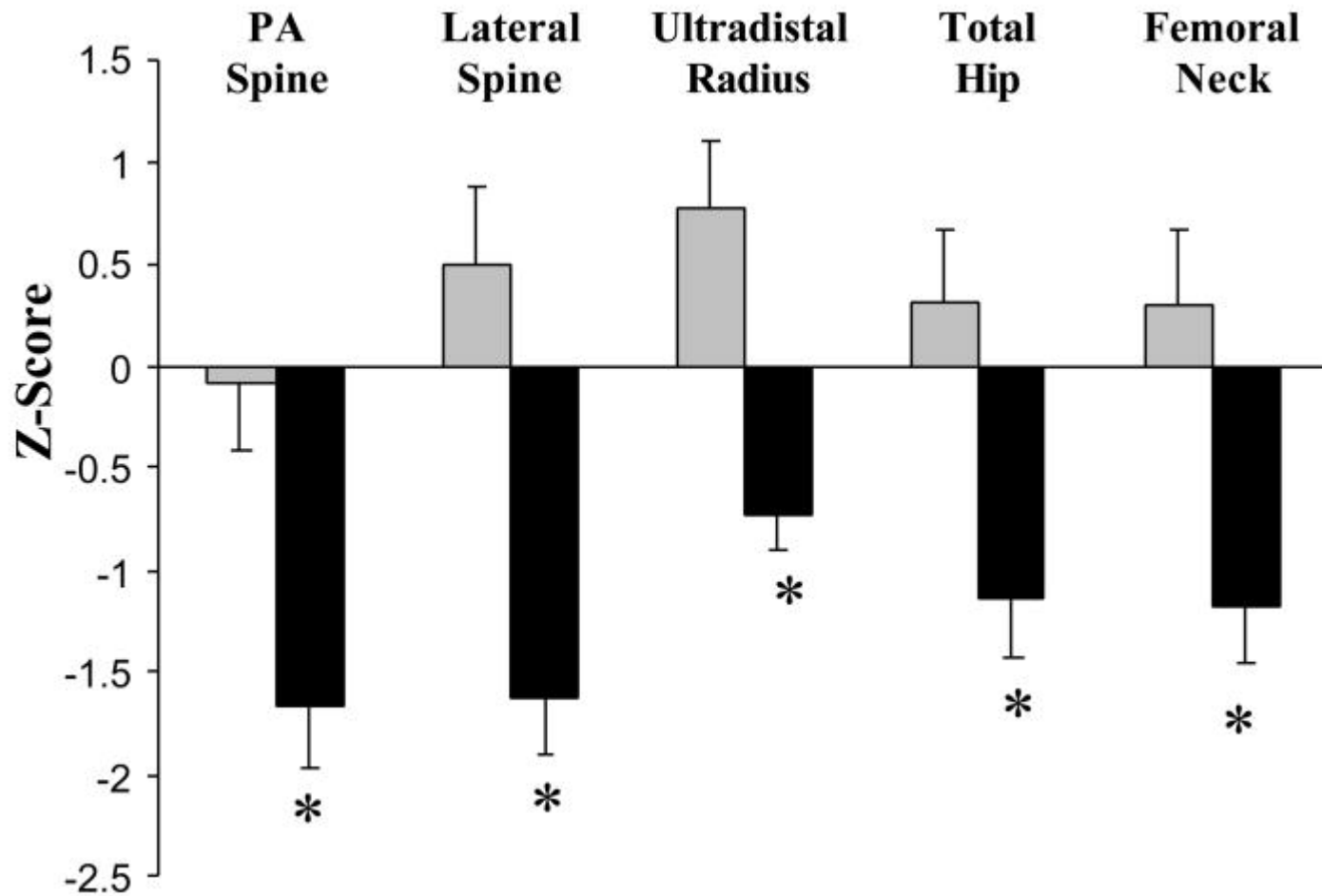
Producción de Cortisol en la Anorexia Nerviosa



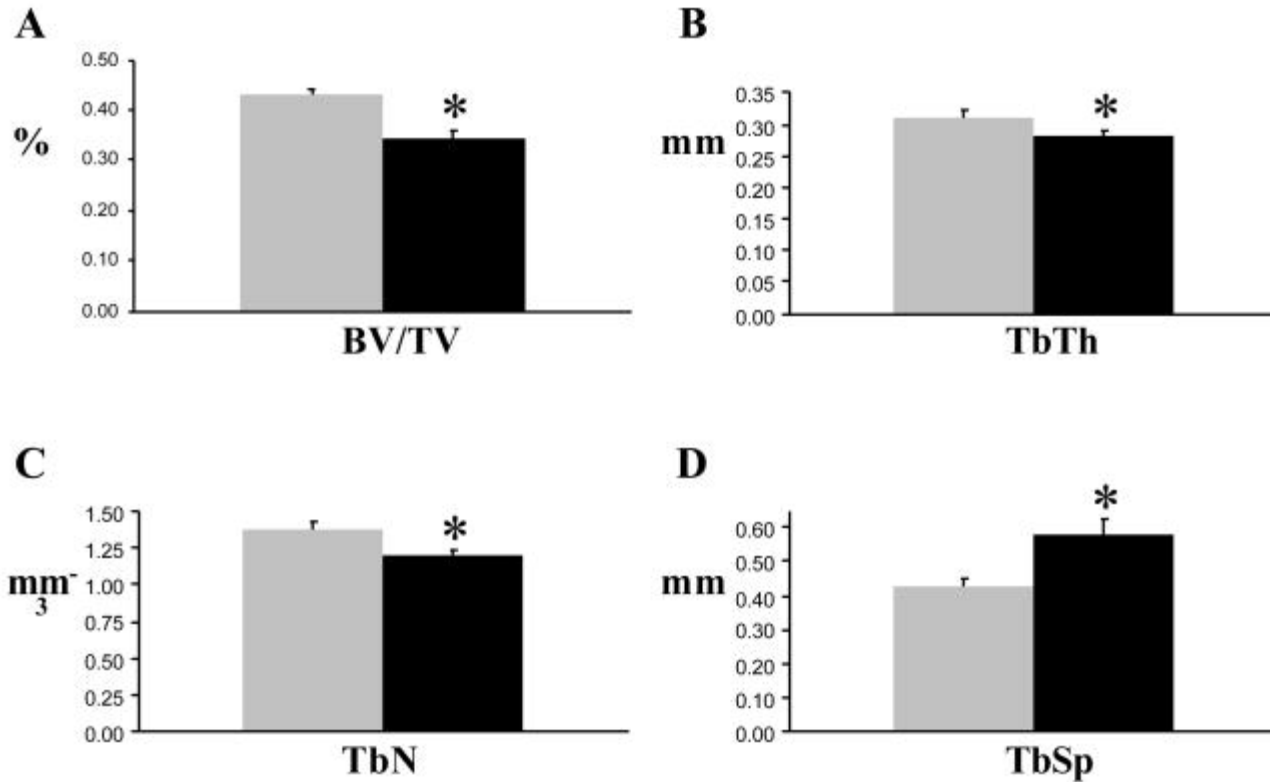
Fisiopatología de la pérdida ósea en Anorexia Nerviosa



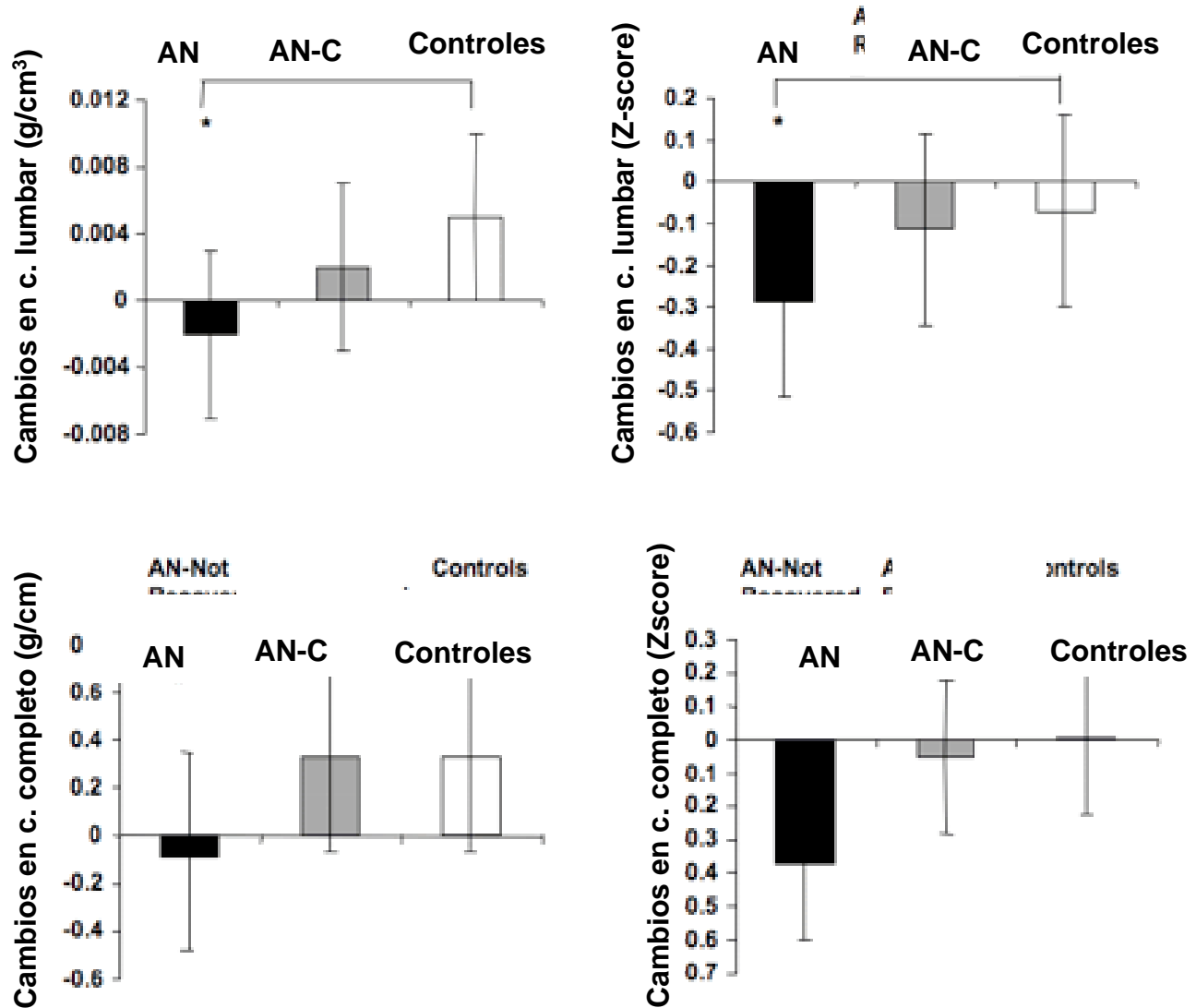
Masa ósea en pacientes con Anorexia Nerviosa



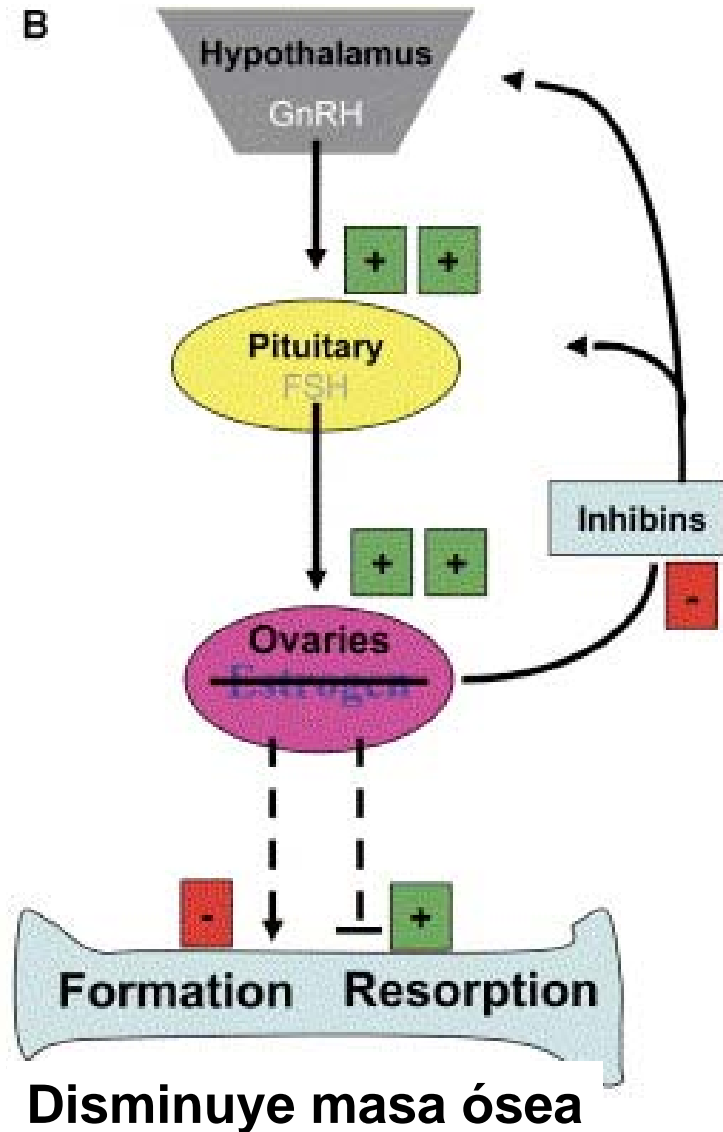
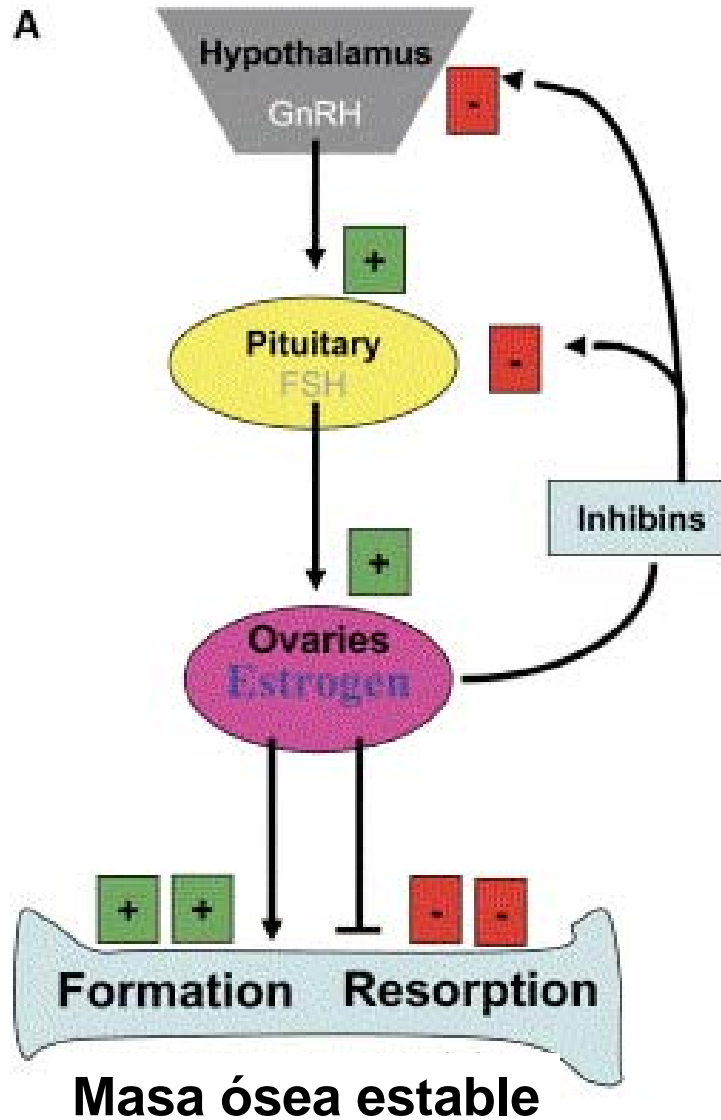
Estructura trabecular en la Anorexia Nerviosa



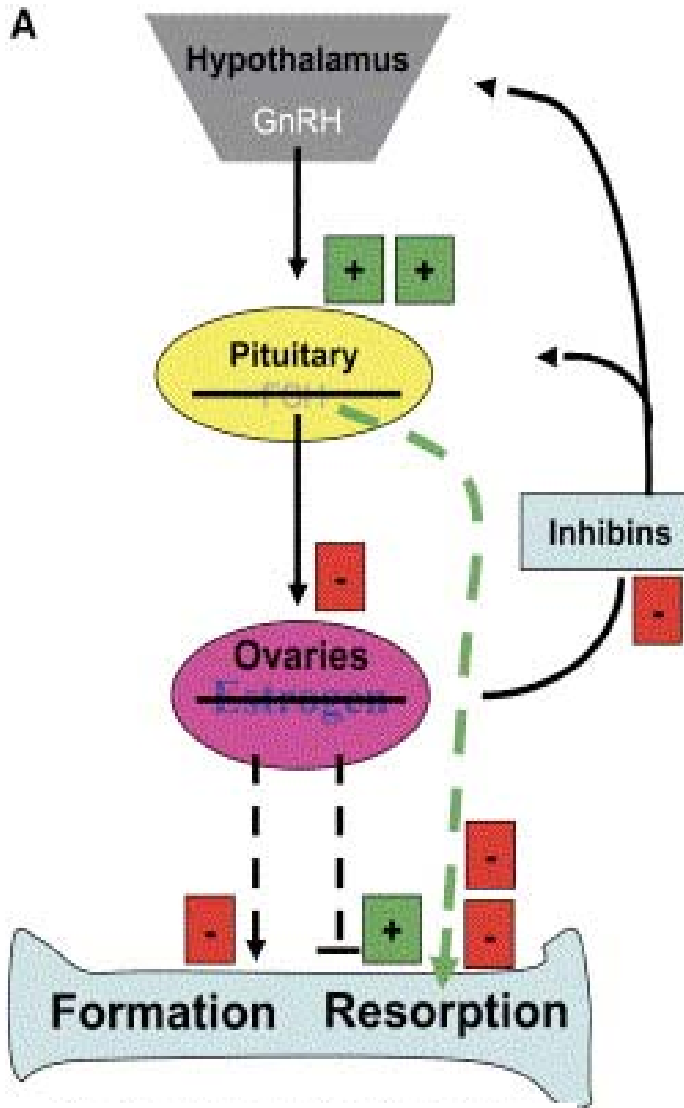
Masa ósea en A.N. y control de la enfermedad



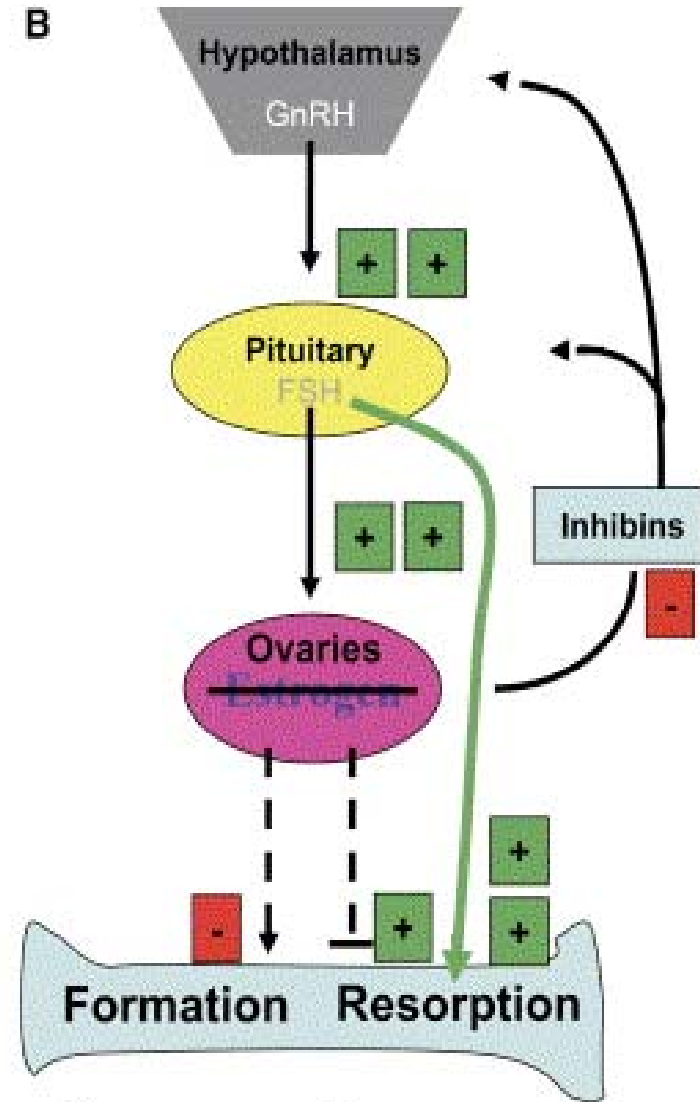
Eje Diencéfalo-Hipófisis-Ovario y metabolismo óseo



Eje Diencéfalo-Hipófisis-Ovario y metabolismo óseo

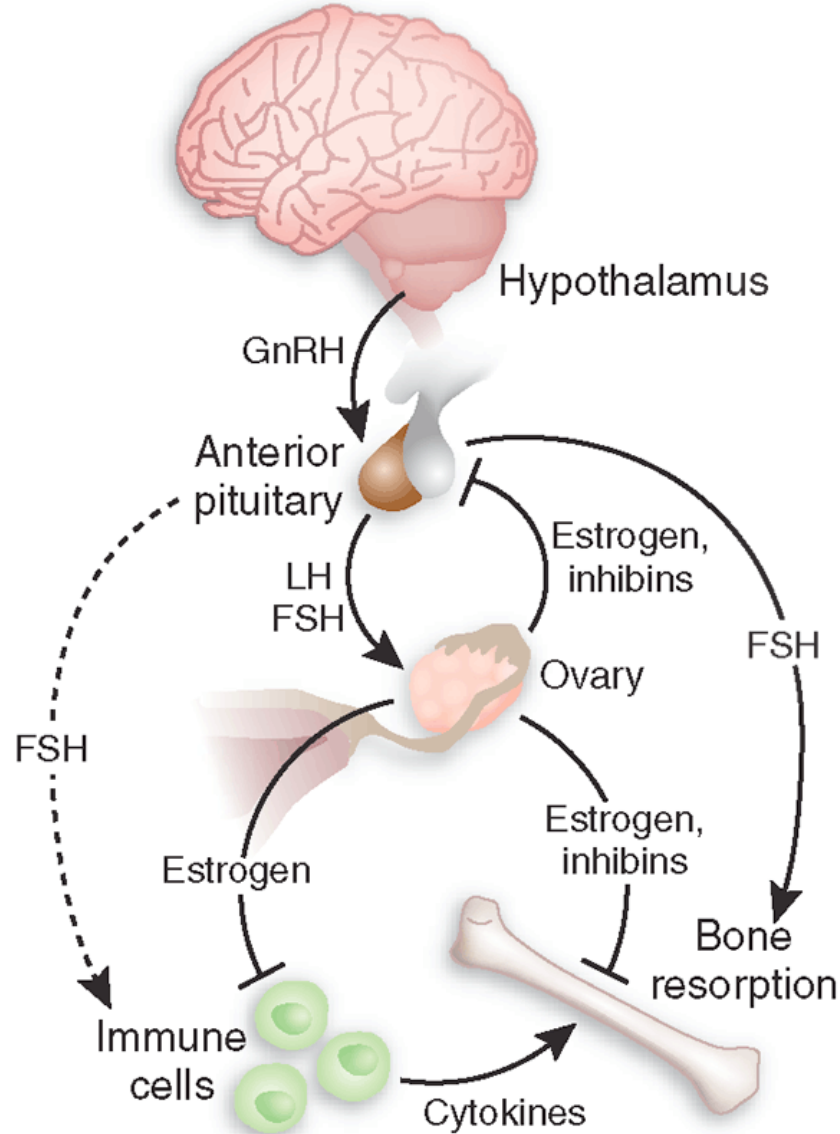


Aumenta masa ósea

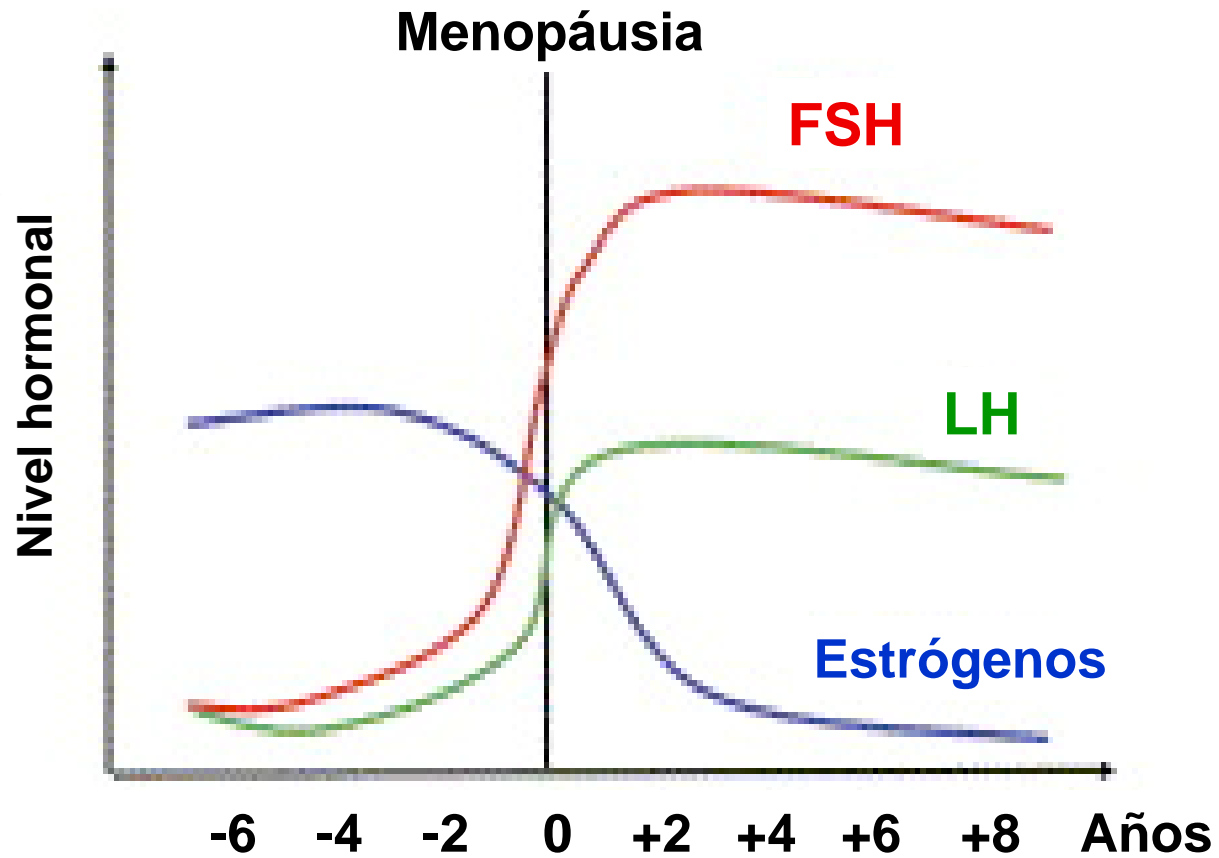


Disminuye masa ósea

Eje Diencéfalo-Hipófisis-Ovario y metabolismo óseo



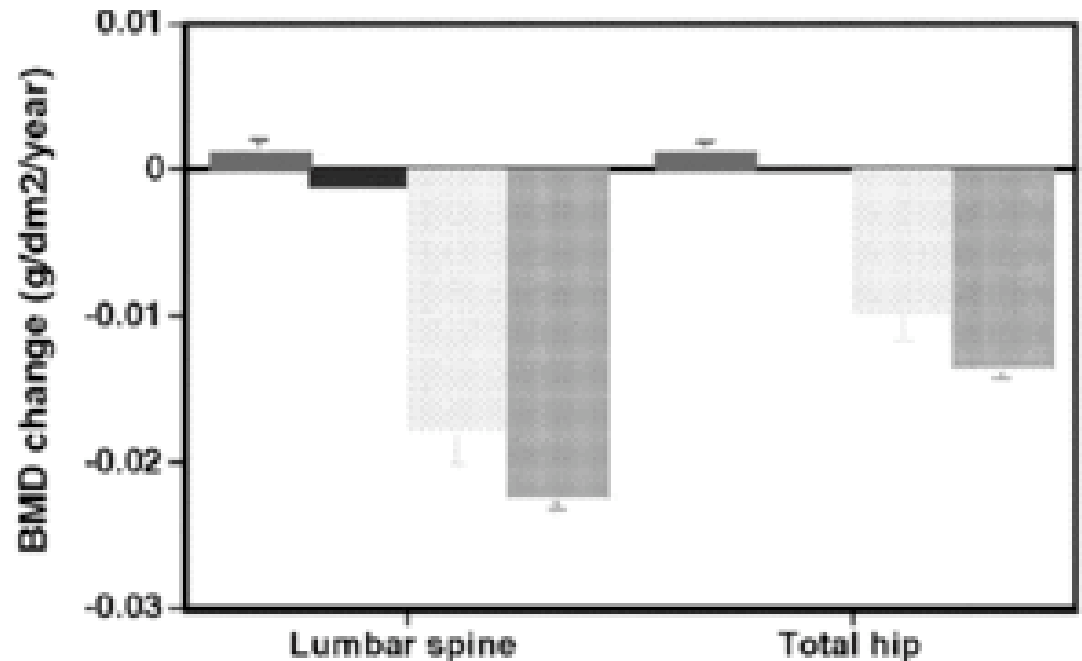
Evolución niveles hormonales durante la perimenopáusia



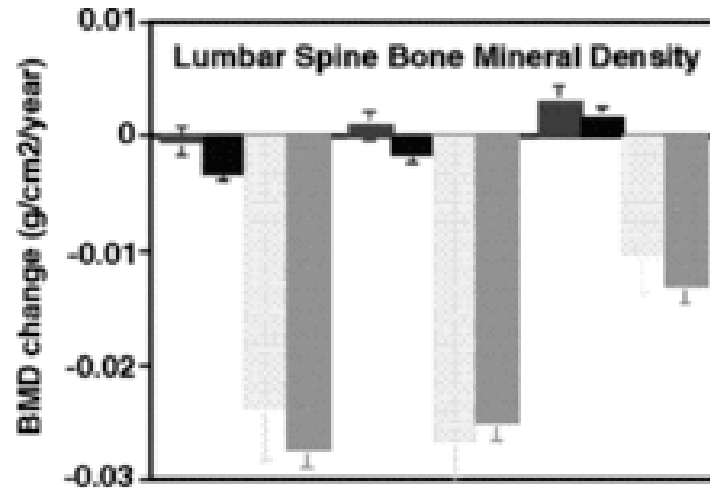
Evolución de la masa ósea durante la perimenopausia

Menopausal Stage

- Premenopause: bleeding in each of the last 3 months
- Early perimenopause: bleeding in 1 to 3 of the last 3 months plus some change in regularity
- Late perimenopause: no bleeding in 3-11 of the last 12 months
- Postmenopause: no bleeding \geq 12 months

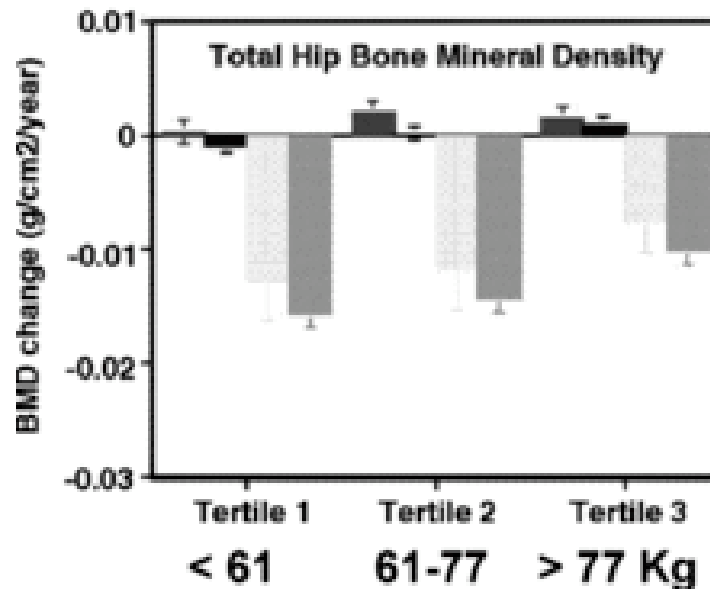


Evolución masa ósea perimenopáusica según peso



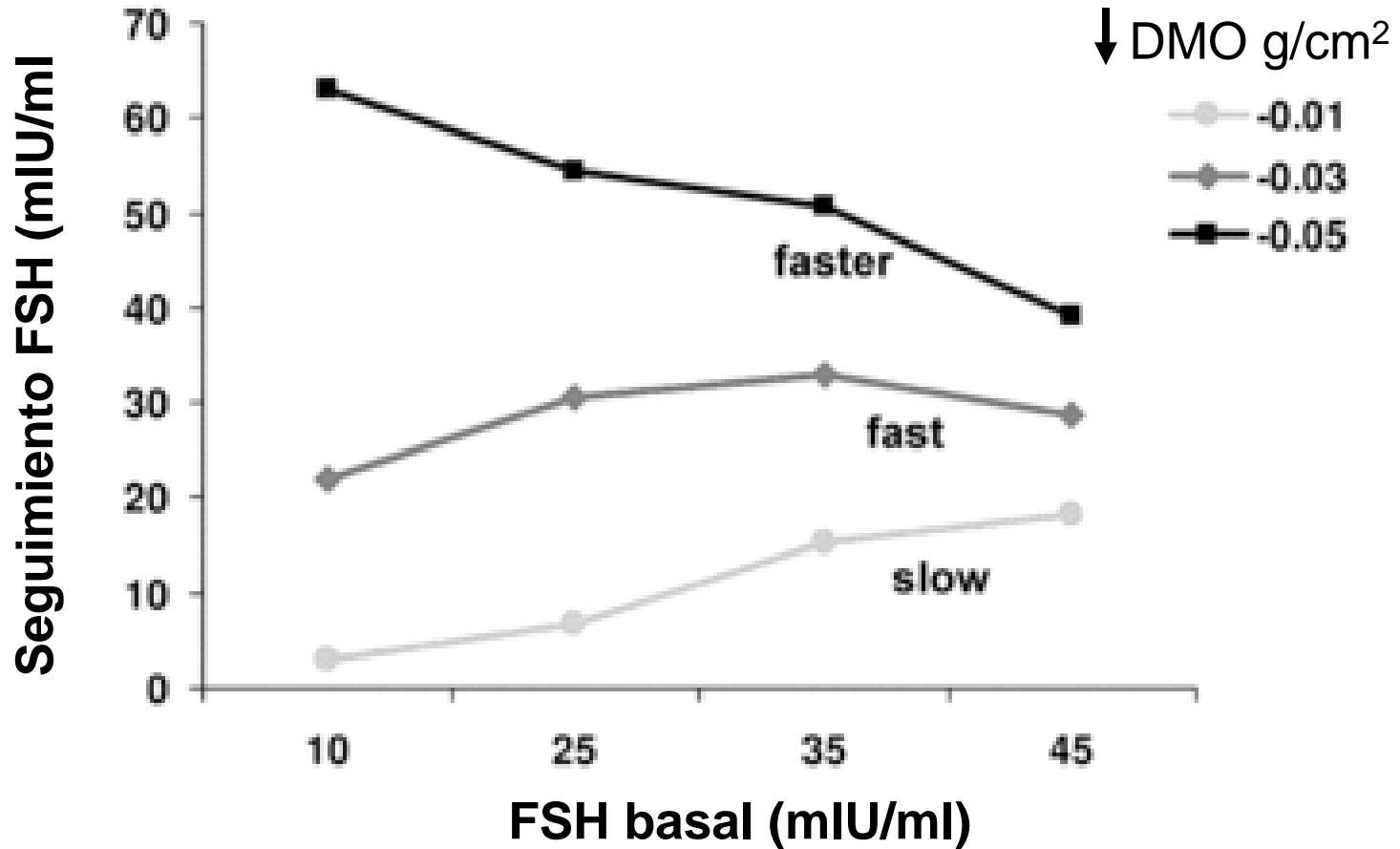
Tertile 3: slower spine loss ($P < 0.001$)
at all menopausal stages

slower hip loss ($P < 0.001$)
only after menopause

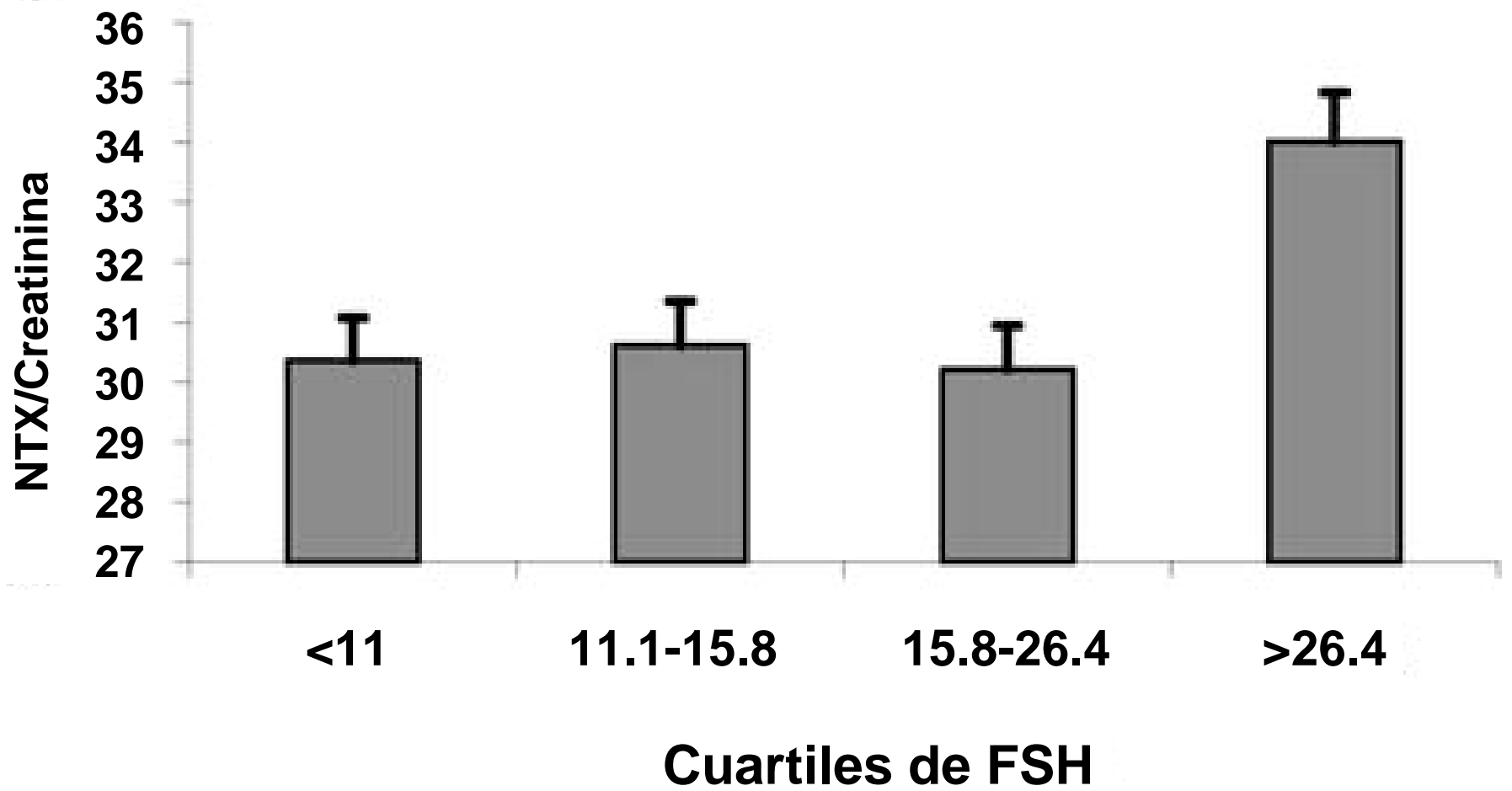


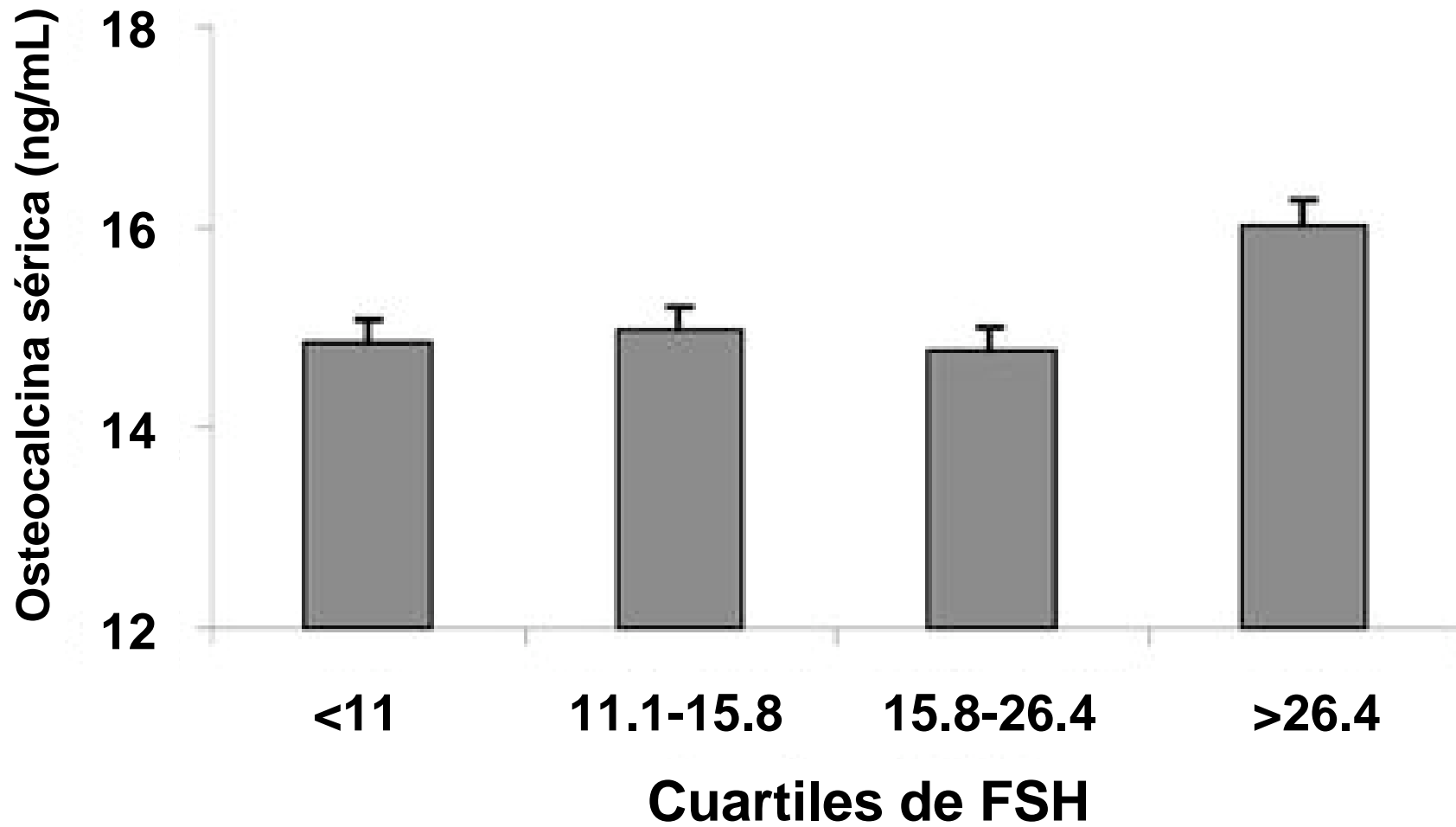
- premenopause
- early perimenopause
- late perimenopause
- postmenopause

Pérdida de masa ósea según niveles de FSH



(ajustado por peso, edad, raza, tabaco y localización geográfica)



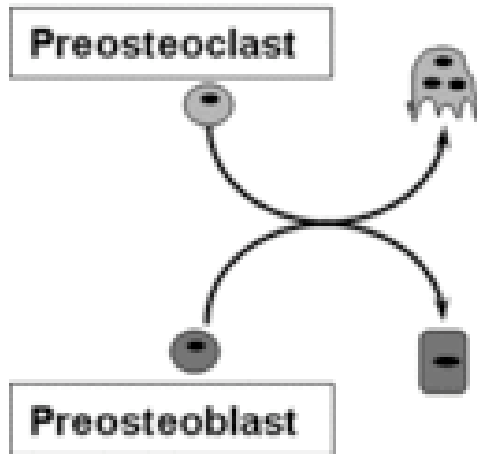


A**PREMENOPAUSAL**

Cycling Estradiol

Cycling Inhibin

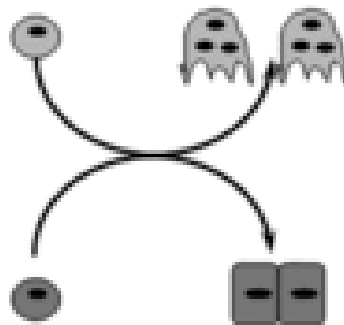
Local Activin, BMP

*Normal Turnover***B****PERI-MENOPAUSAL**

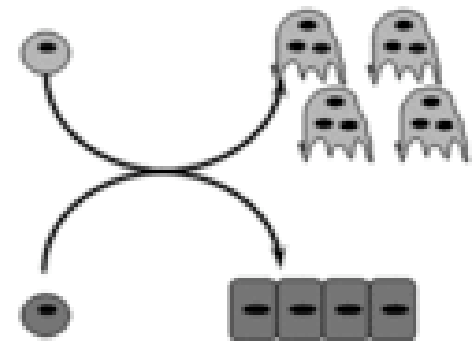
Cycling Estradiol

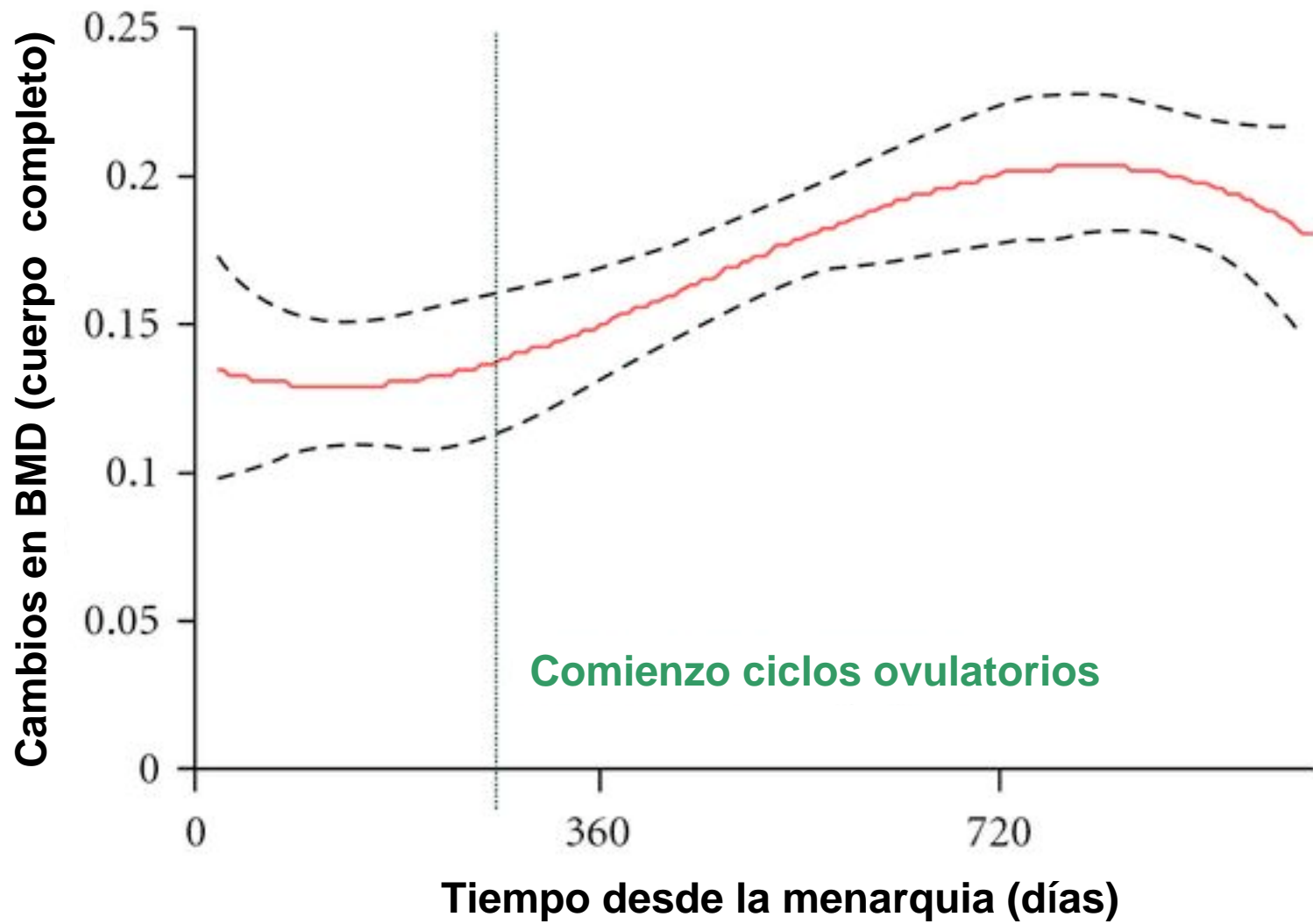
↓ Inhibin B, ↑ FSH

↑ Act, BMP tone

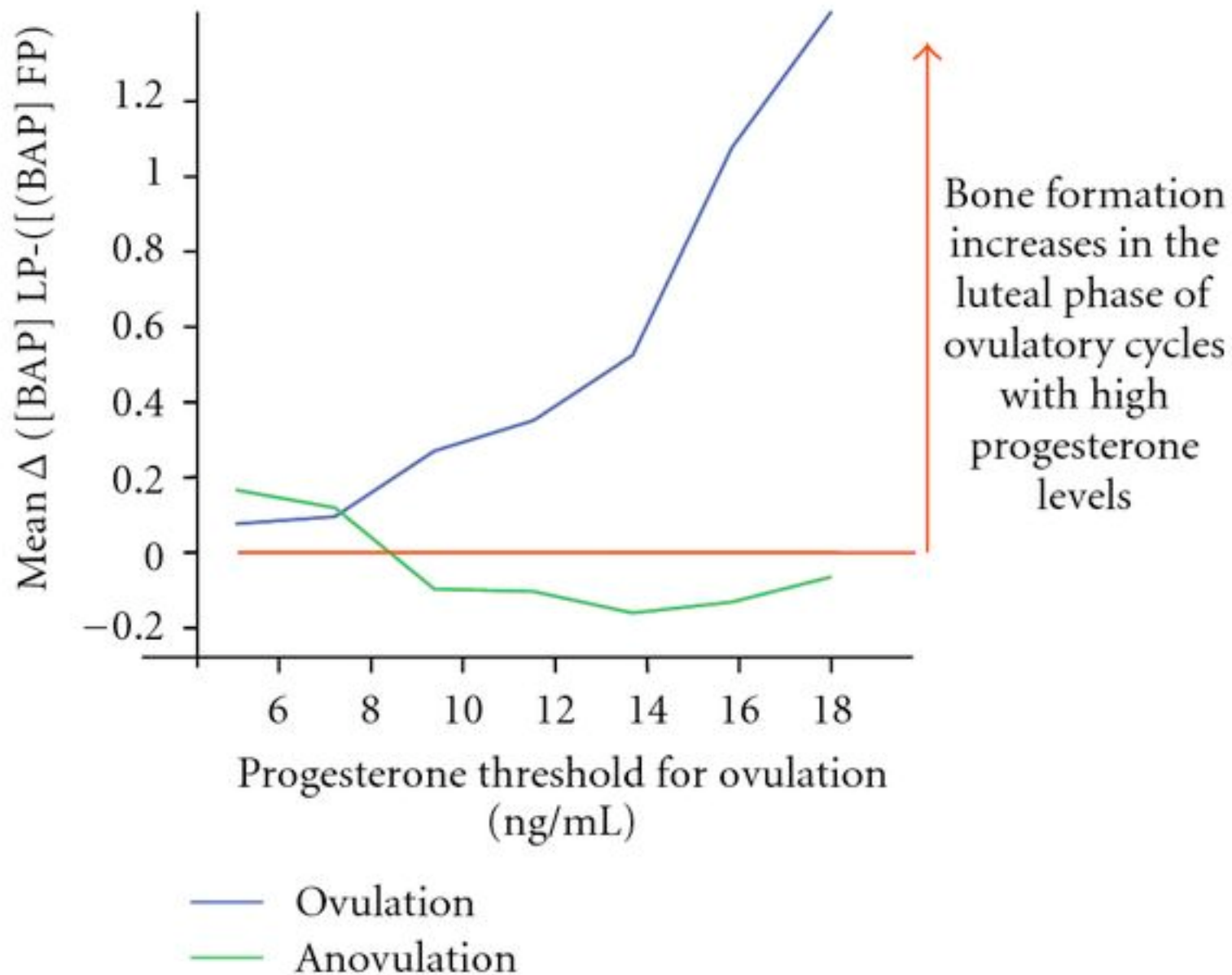
↑ *Turnover***C****POSTMENOPAUSAL**

↓ Estradiol
 ↓ Inh A, Inh B, ↑ FSH
 ↑ Act, BMP tone

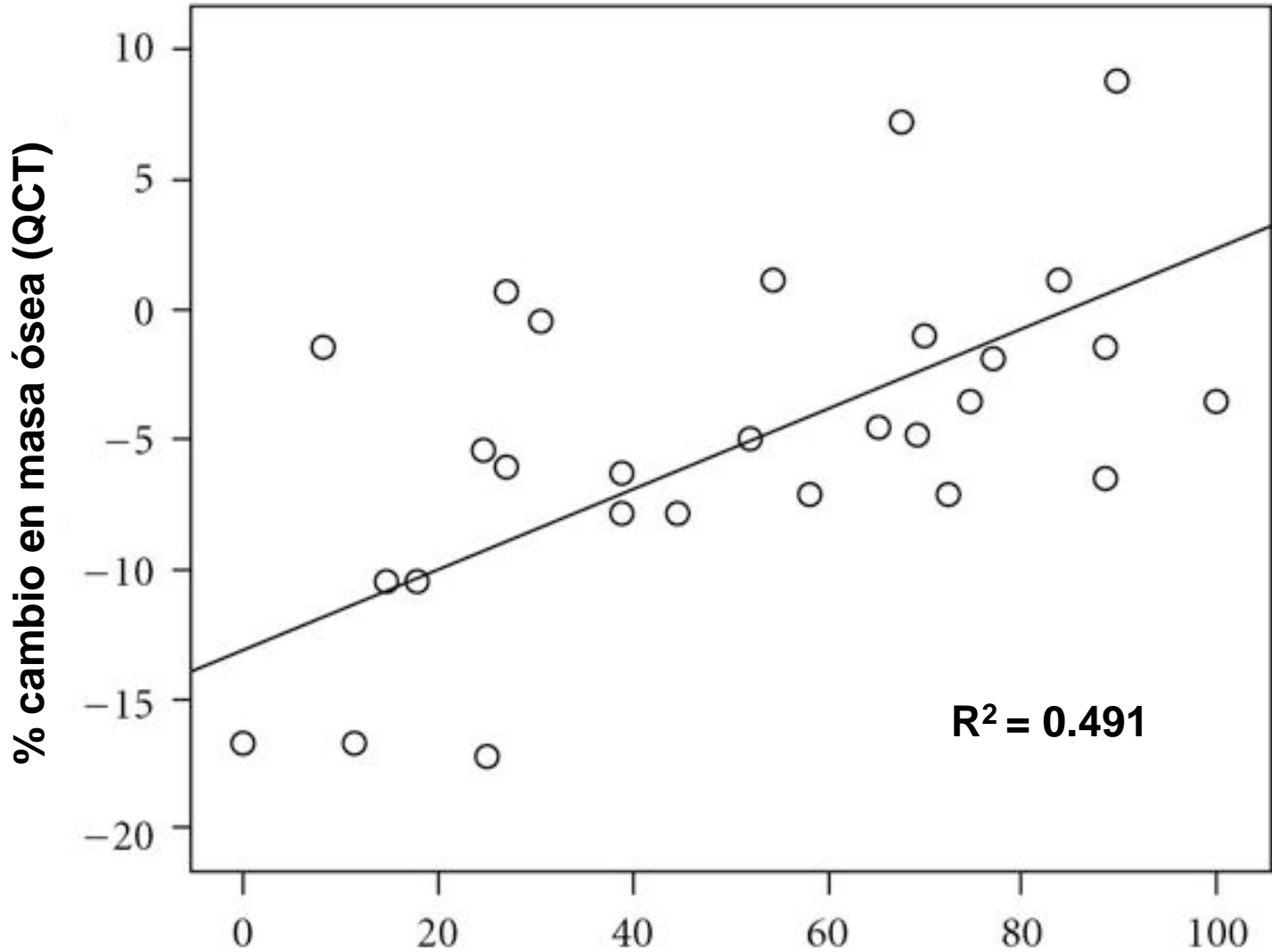
↑ *Turnover*



Serum bone alkaline phosphatase (BAP) as bone formation marker

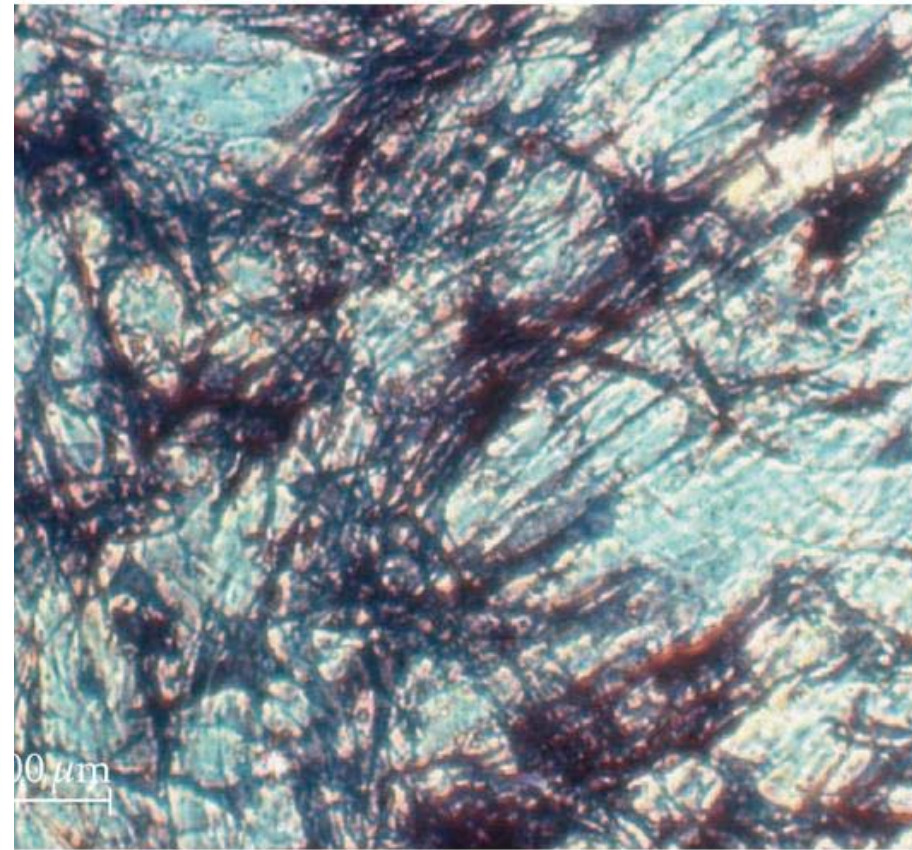
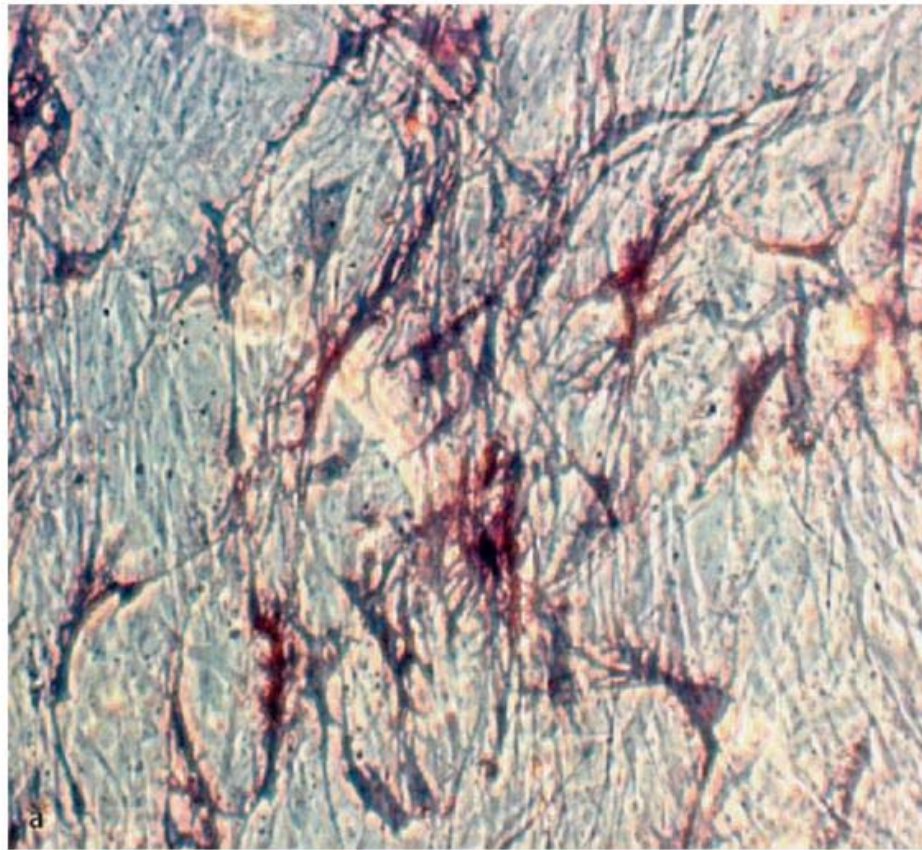


Cambios BMD (2 años)



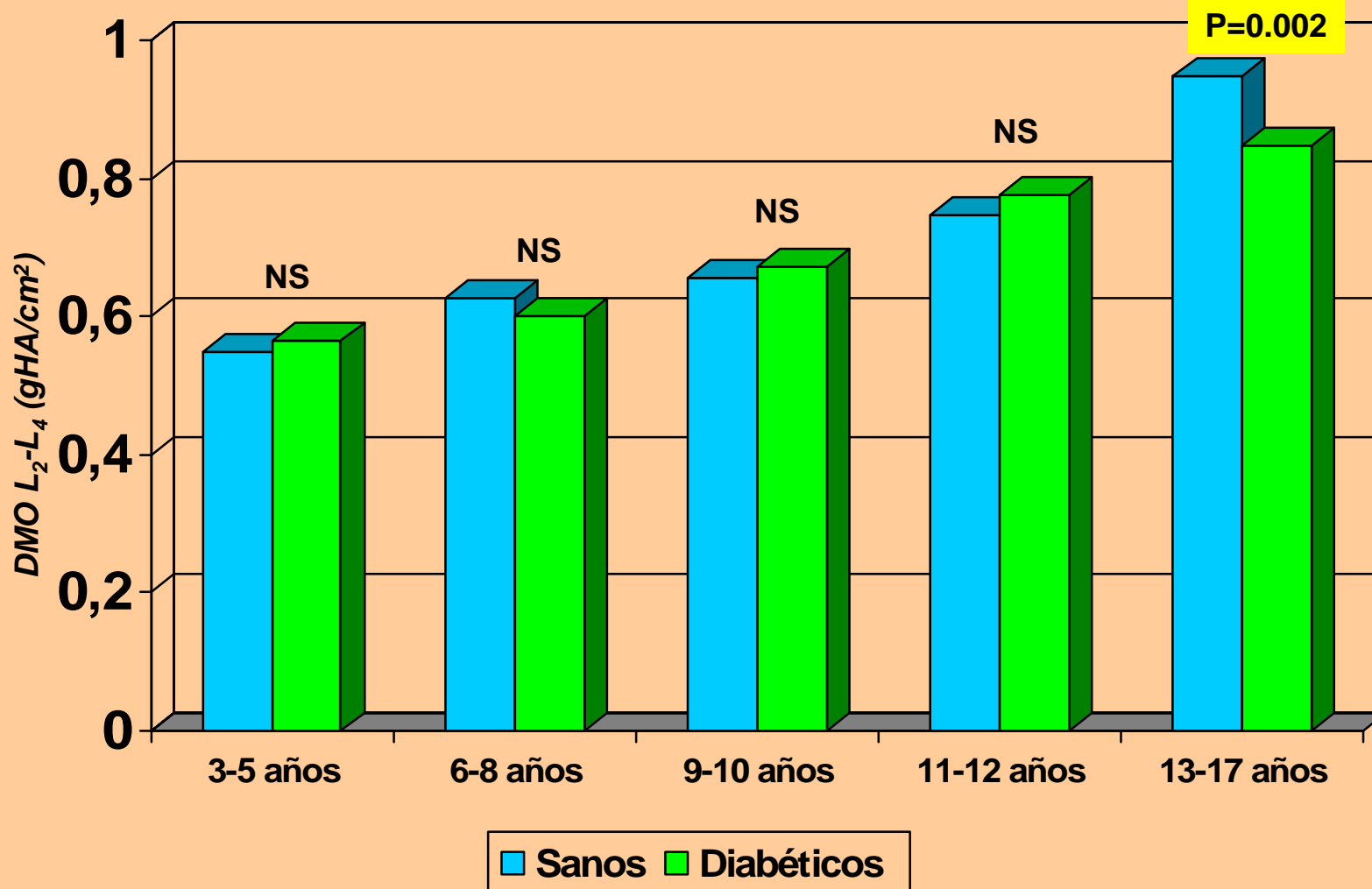
% de ciclos ovulatorios N= 44

Acción de E-2 y E-2+P sobre la producción de F.A. en cultivos de Obs humanos



- V. Seifert-Klauss et al: Progesterone and Bone. J. Osteoporosis 2010; on line 31 October

DIABETES TIPO 1 (NIÑOS)



DIABETES Y HUESO (Meta-análisis)

P. Vestergaard.: Osteoporosis Int. 2007;18:427-444

RR de Fx. encontrado y RR esperado según DMO

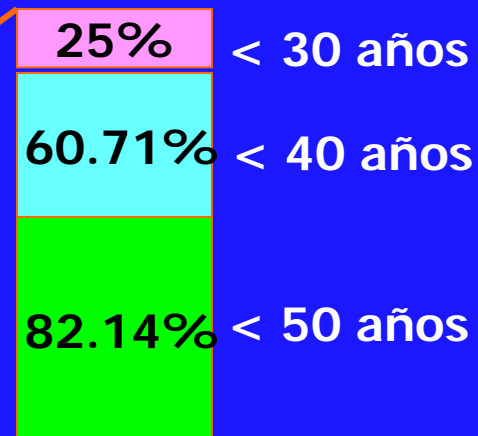
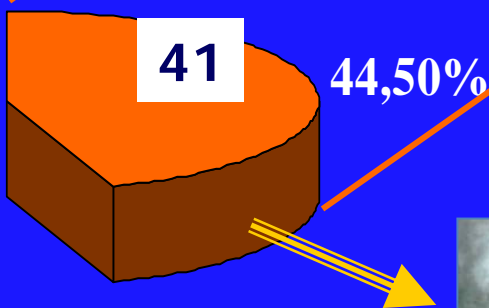
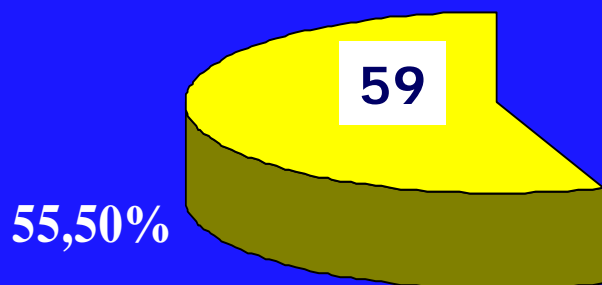
<u>Tipo DM</u>	<u>Tipo Fx.</u>	<u>RR esp.</u>	<u>RR encontr.</u>
Tipo 1	Cadera	1.42	6.95-8.65 <u>(x 5)</u>
Tipo 2	Cadera	0.77	1.38 <u>(x 1.8)</u>
	Toda Fx.	0.85	1.19 <u>(x 1.4)</u>

No existe relación entre DMO y HbA1C. Mayor riesgo de fractura y menor DMO en los pacientes con complicaciones de la diabetes

EII y Fracturas

N= 100

Deformidad vertebral > 20%



■ Fx ■ No Fx



```
graph TD; A[ESTUDIO DESCRIPTIVO DE MUJERES CON FRACTURA DEL EDR N=71] --> B[ESTUDIO DE CASOS Y CONTROLES N=187]; B --> C[CASOS N=96 HIJAS DE MUJERES CON FRACTURA DEL EDR]; B --> D[CONTROLES N=91 HIJAS SANAS DE MUJERES SIN FRACTURA DEL EDR]; E[ESTUDIO DESCRIPTIVO DE MUJERES CON FRACTURA DEL EDR N=71] <--> B;
```

**ESTUDIO DESCRIPTIVO
DE
MUJERES CON FRACTURA
DEL EDR**

N=71

**Edad media: 61 años (44-97)*

ESTUDIO DE CASOS Y CONTROLES

N=187

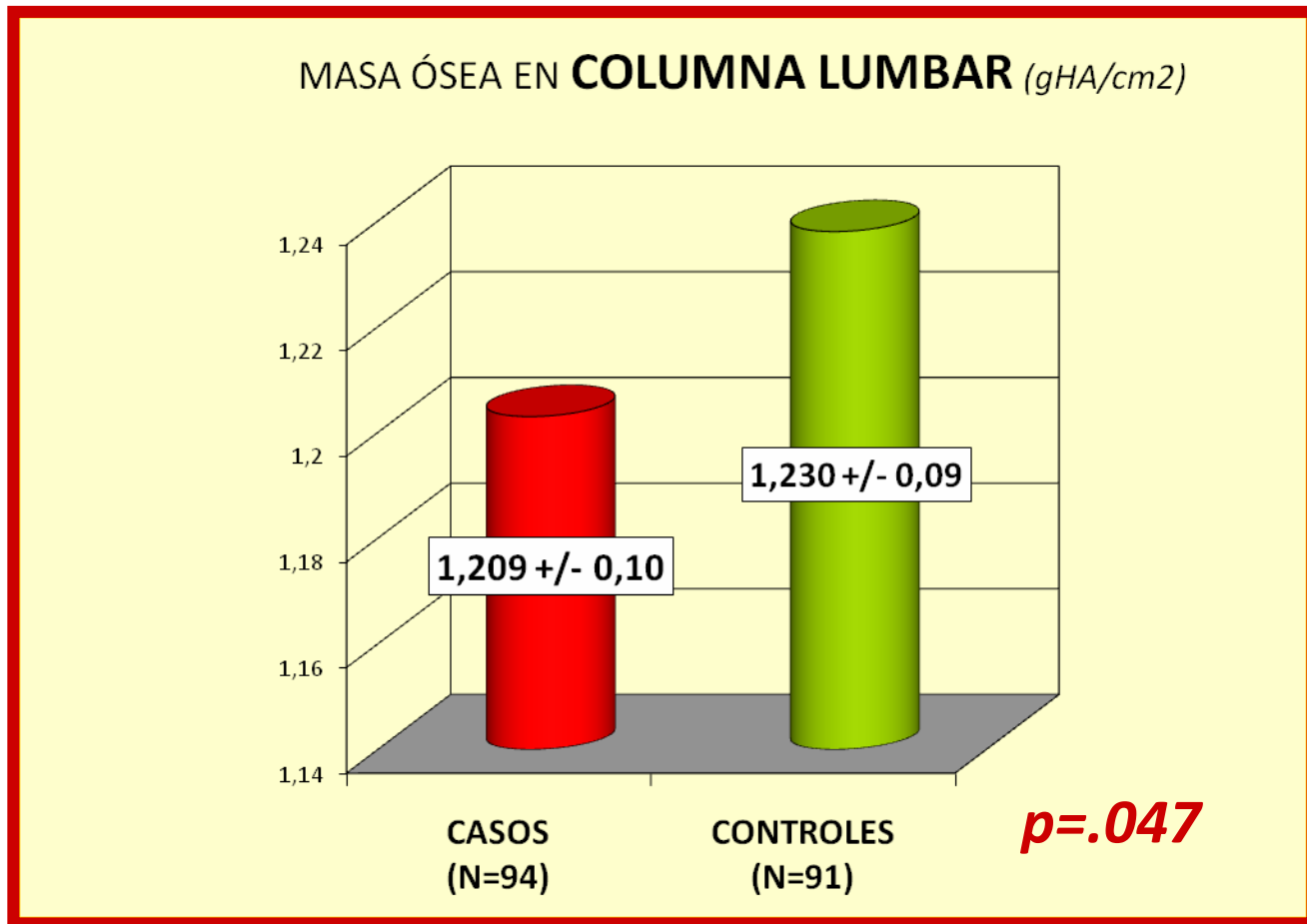
CASOS (N=96)
**(HIJAS DE MUJERES
CON FRACTURA DEL EDR)**

**Edad : 31,13 +/- 5,0 años*

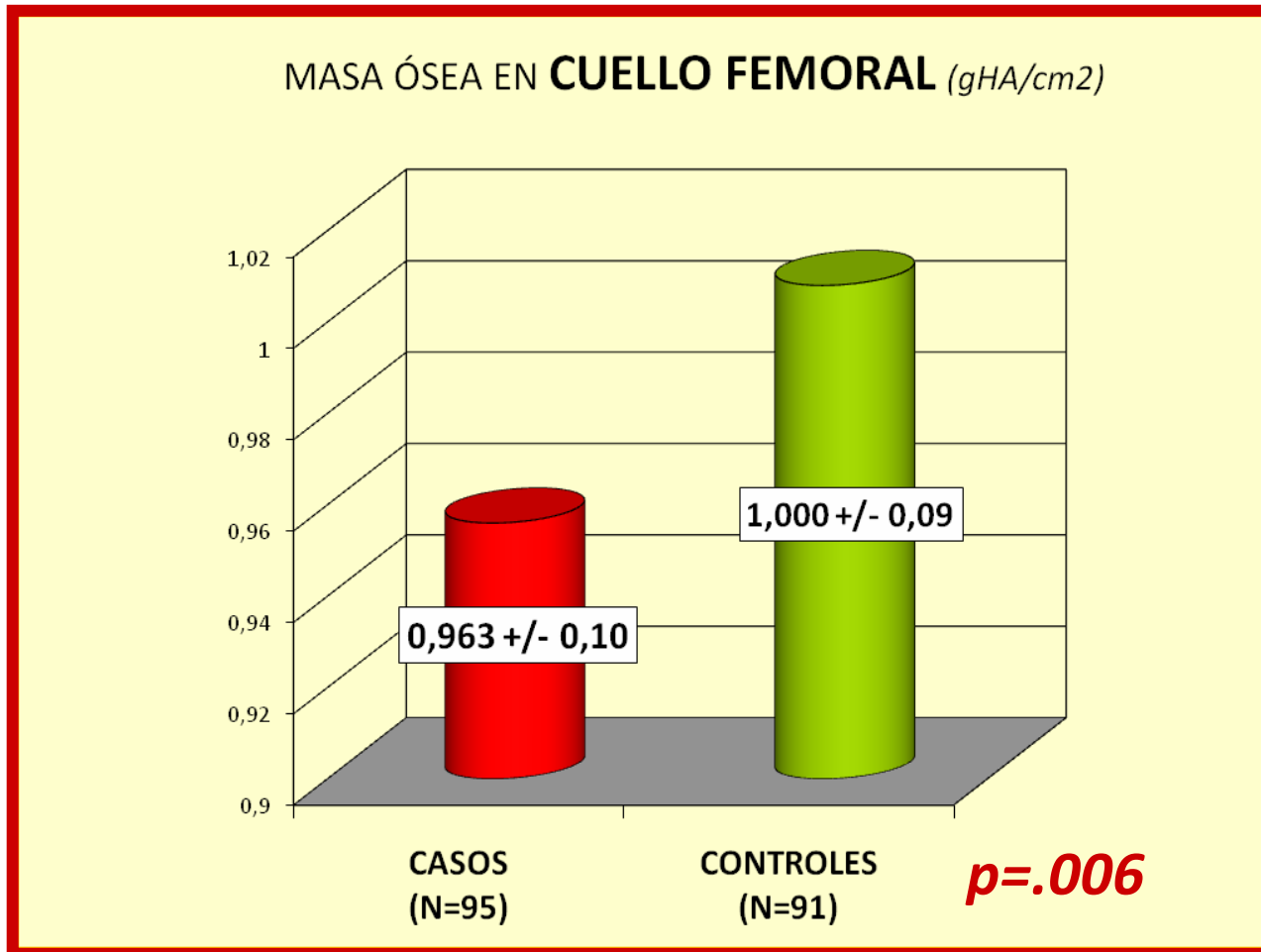
CONTROLES (N=91)
**(HIJAS SANAS DE
MUJERES SIN FRACTURA
DEL EDR)**

**Edad : 29,44 +/- 5,8 años.*

COMPARACIÓN DE LA MASA ÓSEA EN AMBOS GRUPOS DE MUJERES (C. Lumbar)

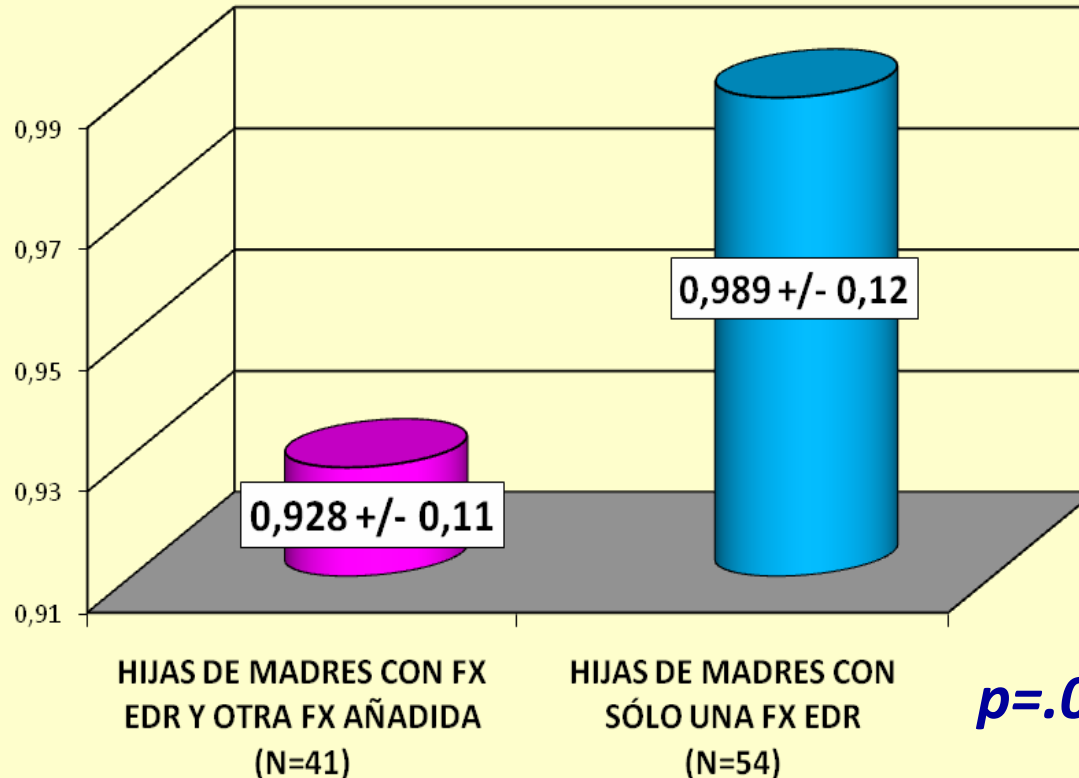


COMPARACIÓN DE LA MASA ÓSEA EN AMBOS GRUPOS DE MUJERES (Cuello Fémur)



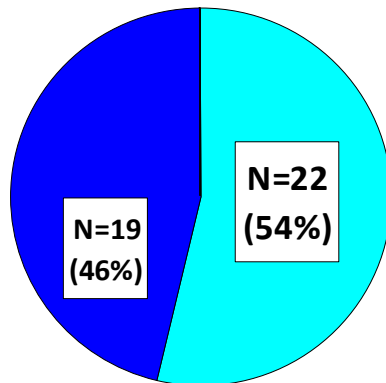
COMPARACIÓN DE LOS VALORES DE MASA ÓSEA EN HIJAS DE MUJERES CON FRACTURA DEL EDR EN BASE A LA EXISTENCIA O NO DE OTRA FRACTURA OSTEOPORÓTICA MATERNA

MASA ÓSEA EN **CUELLO FEMORAL** (gHA/cm²)



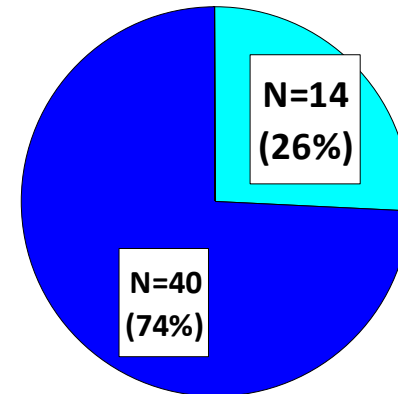
p=0.017

HIJAS DE MUJERES CON OTRA/S
FRACTURA/S ASOCIADA/S A LA DEL EDR



■ Z-score < - 0,5
■ Z-score >= - 0,5

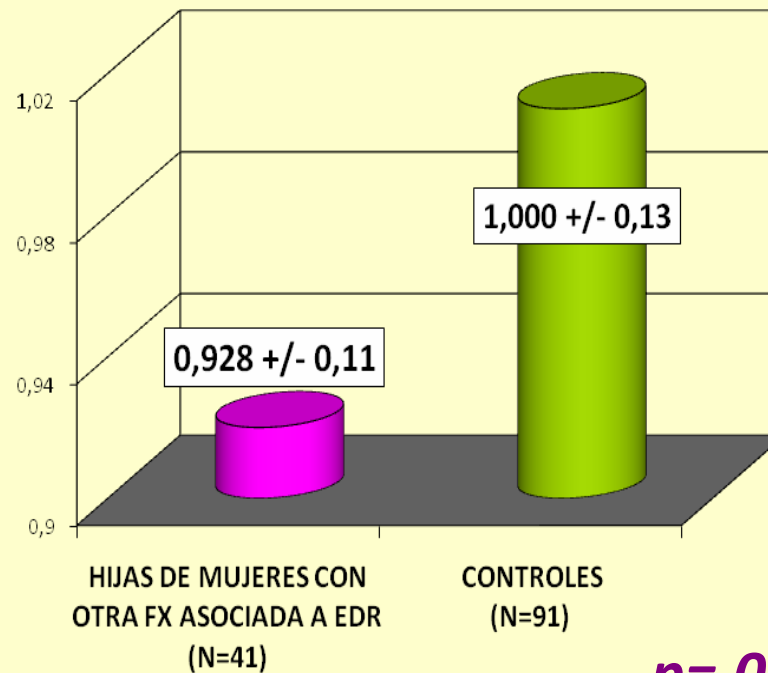
HIJAS DE MUJERES CON SÓLO
FRACTURA DEL EDR



El antecedente materno de más de una fractura por fragilidad triplica el riesgo de presentar una menor masa ósea ($Z\text{-score} < - 0.5$) a nivel de CUELLO FEMORAL.

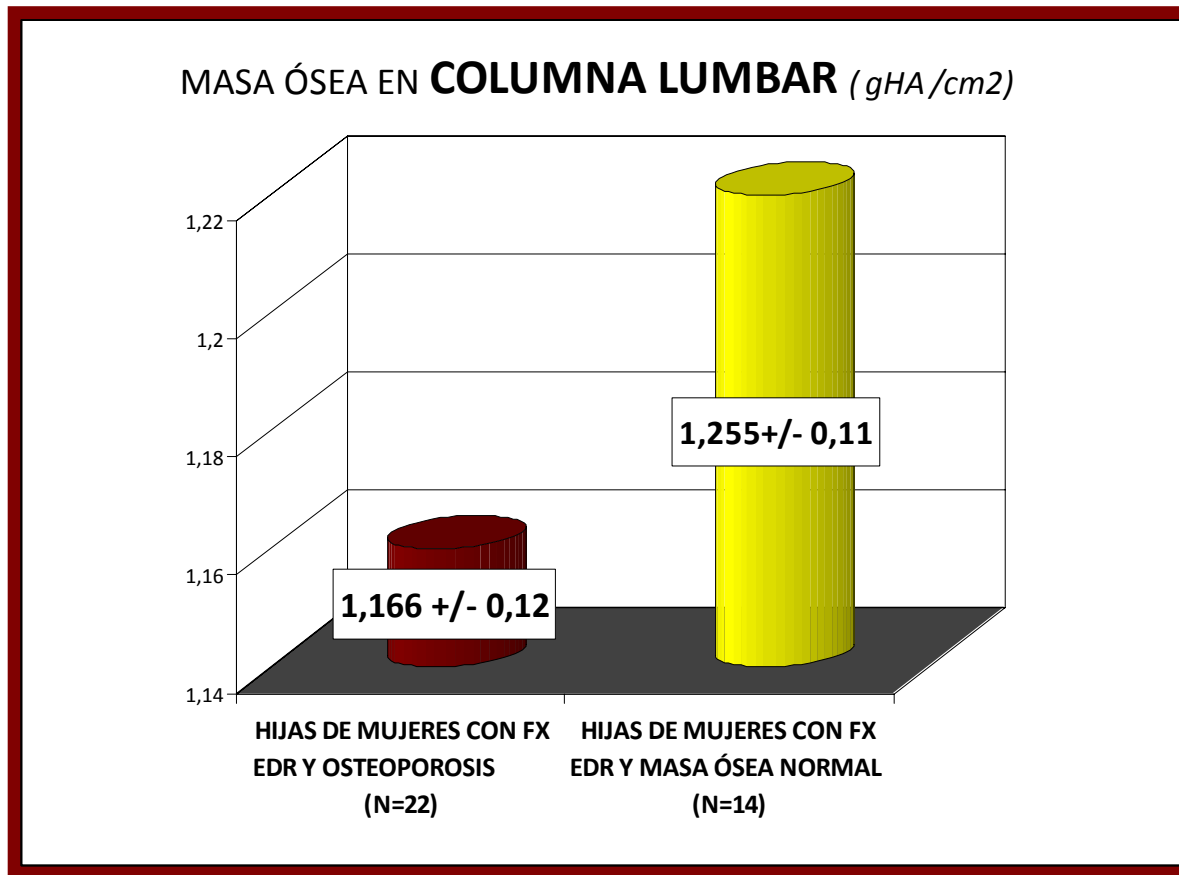
COMPARACIÓN DE LOS VALORES DE MASA ÓSEA ENTRE CONTROLES E HIJAS DE MUJERES CON FRACTURA DEL EDR CON O SIN OTRA/S FRACTURA/S AÑADIDA/S.

MASA ÓSEA EN CUELLO FEMORAL (gHA/cm²)



p=.011

COMPARACIÓN DE LOS VALORES DE MASA ÓSEA EN LAS HIJAS DE MUJERES CON FRACTURA DEL EDR EN BASE A LA MASA ÓSEA MATERNA.



$p=.036$

OP Premenopáusica Idiopática: características clínicas y alteraciones del remodelado óseo.

N=28; Edad= 38.3 +/-7.6 años.

-1 ó más fracturas y/o DMO < -2 Z score.

Resultados: 46% habían tenido fractura previa.

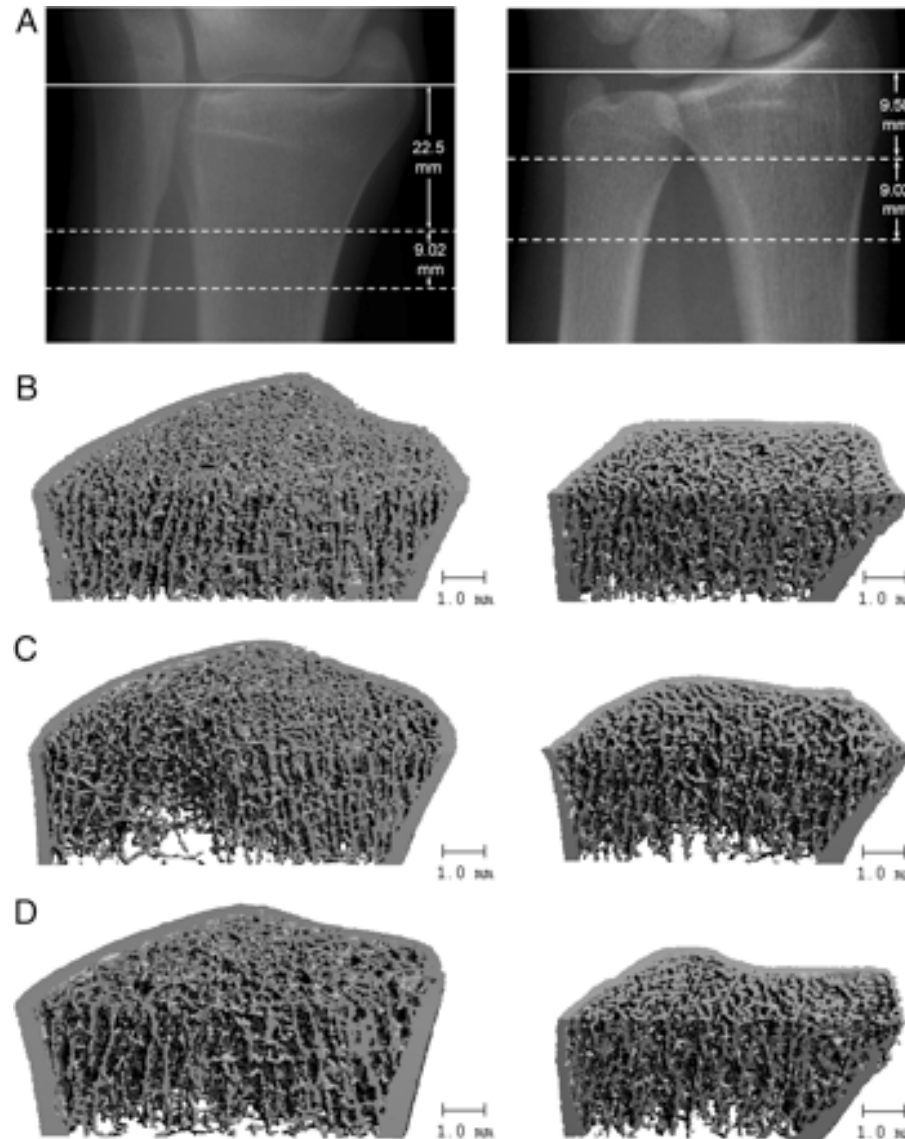
53% antecedente familiar de OP.

36% tenían Hipercalciuria.

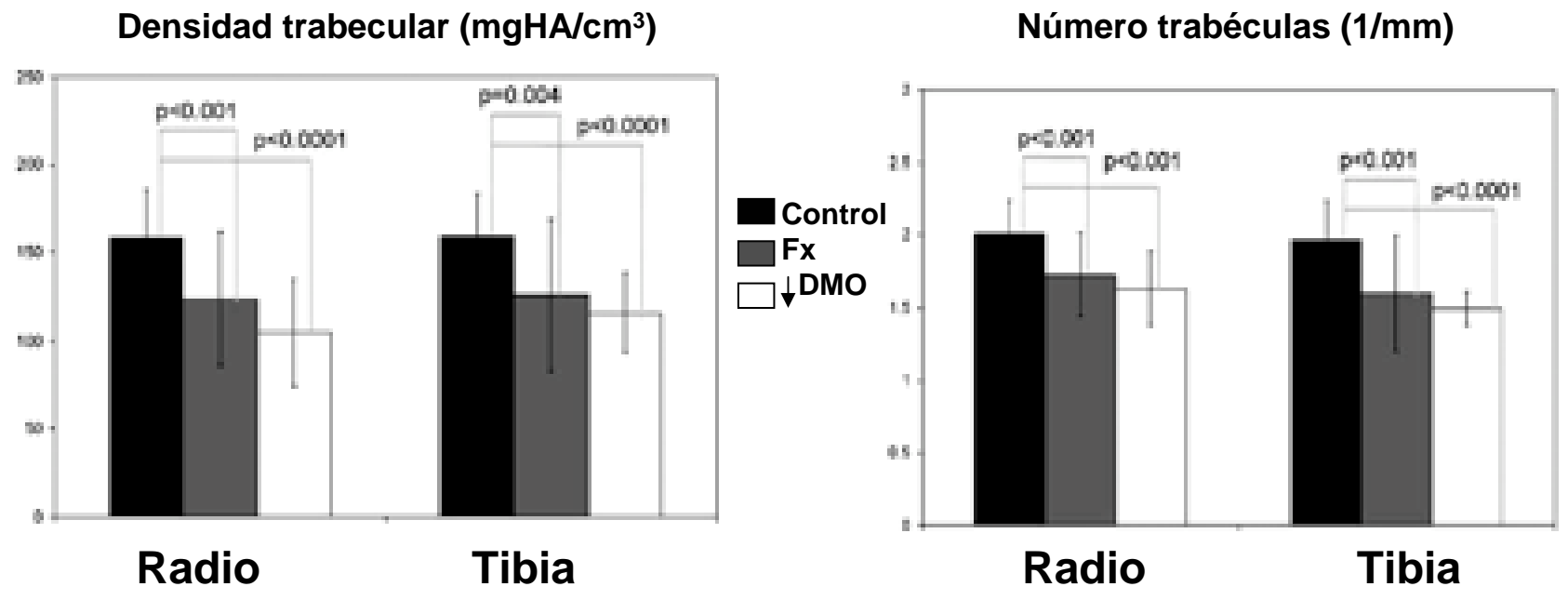
30% tenían IMC < 20.

Se objetivó un aumento de los parámetros de resorción ósea (NTx e Hydroxiprolina), sin cambios en los de formación (FAO y P1NP)

HR-TAC en extremidad distal de tibia y radio en O.P.I.

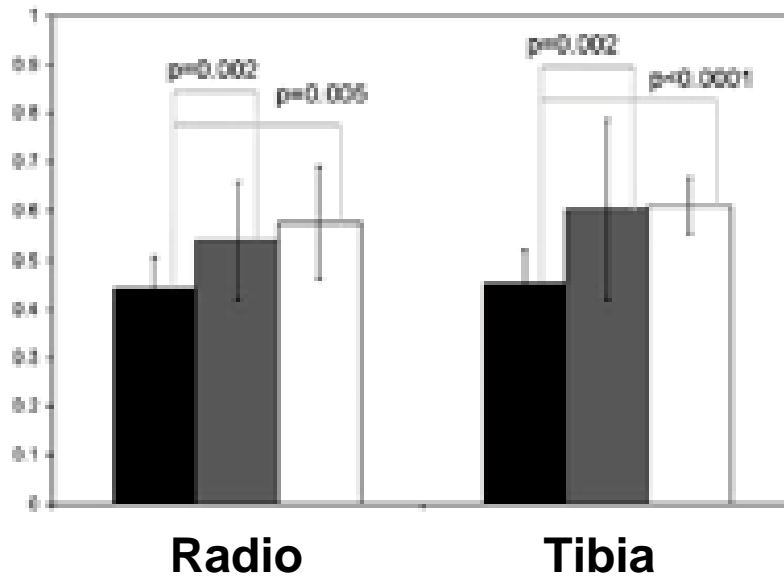


HR-TAC en extremidad distal de tibia y radio en O.P.I.

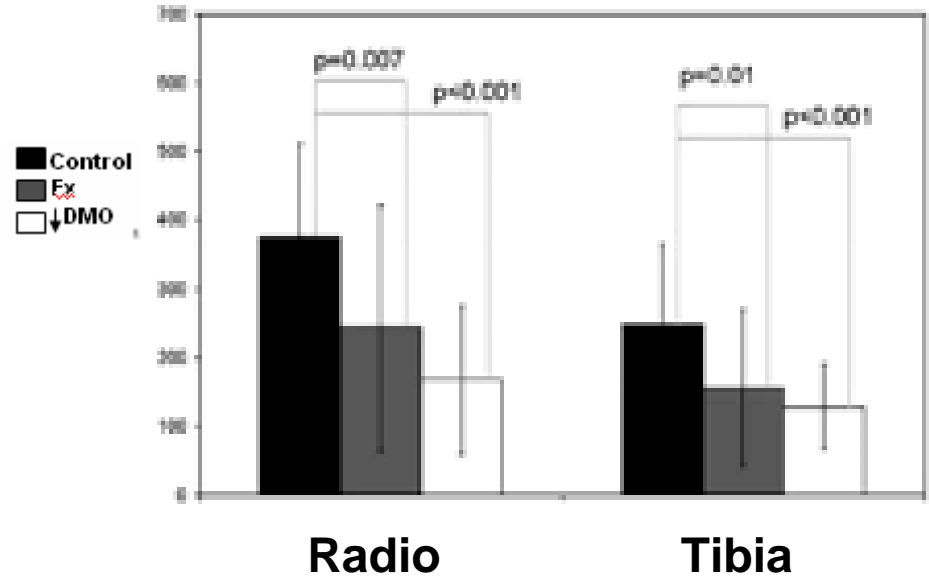


HR-TAC en extremidad distal de tibia y radio en O.P.I.

Separación trabéculas (mm)

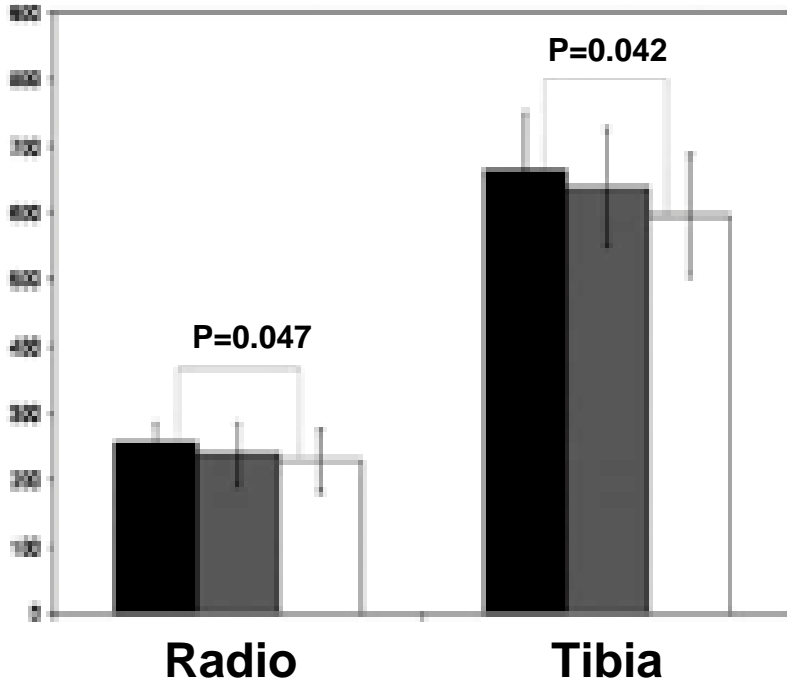


Módulo de Young

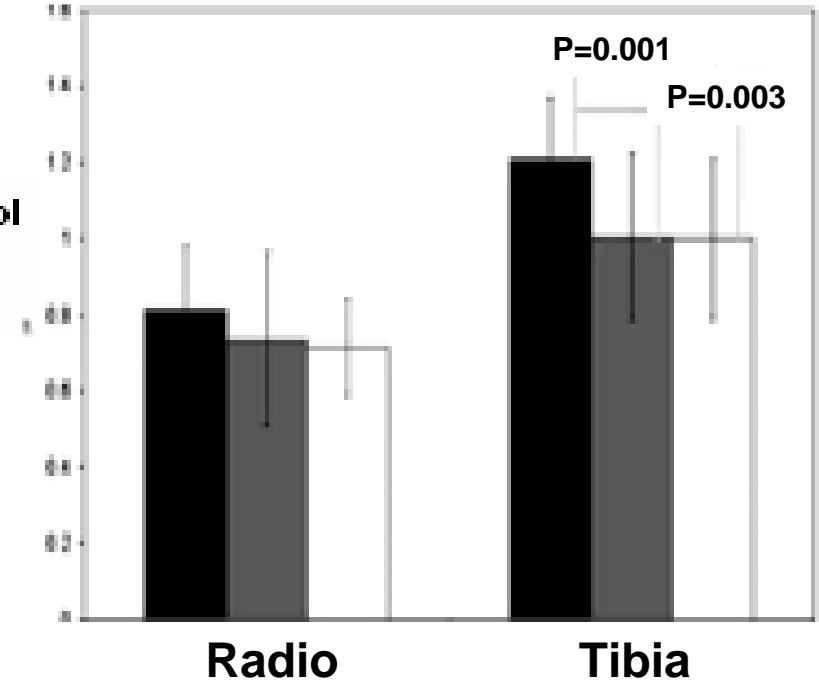


HR-TAC en extremidad distal de tibia y radio en O.P.I.

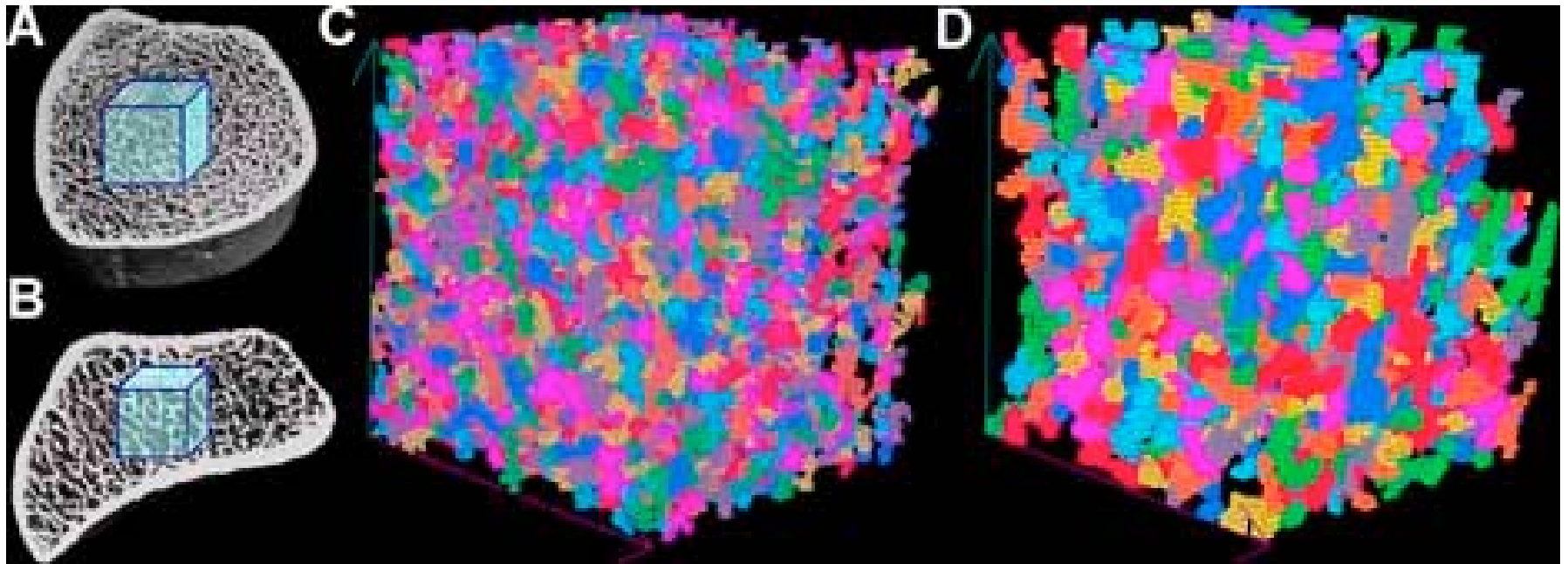
Área ósea (mm²)



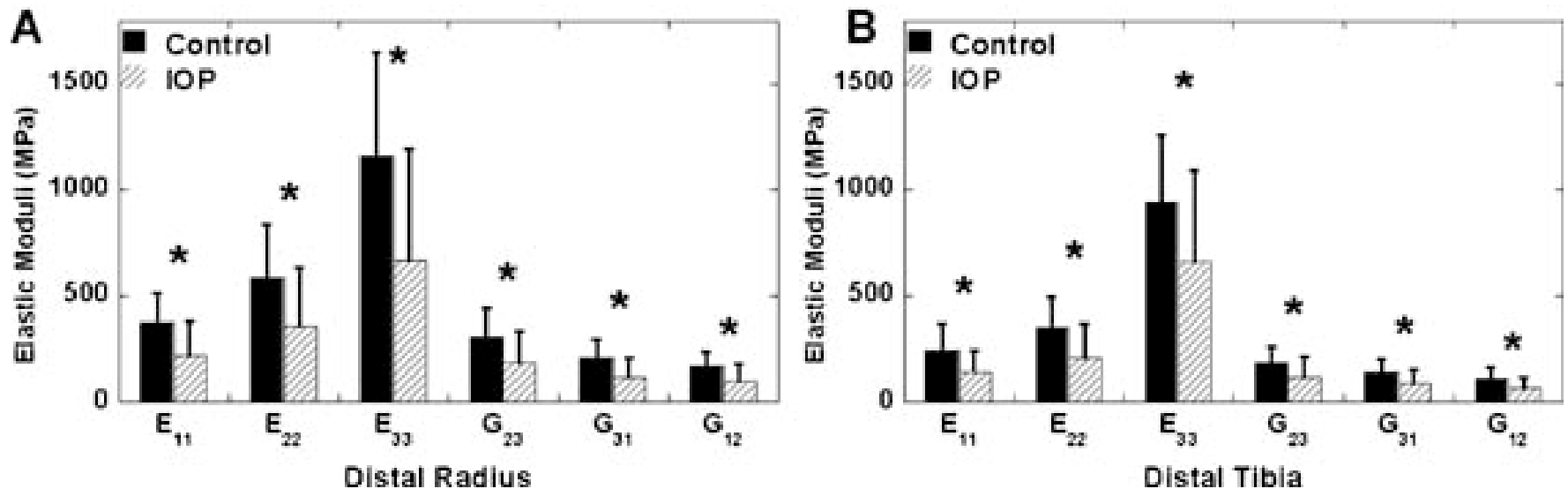
Grosor cortical (mm)



HR-pTAC en extremidad distal de tibia y radio en O.P.I.



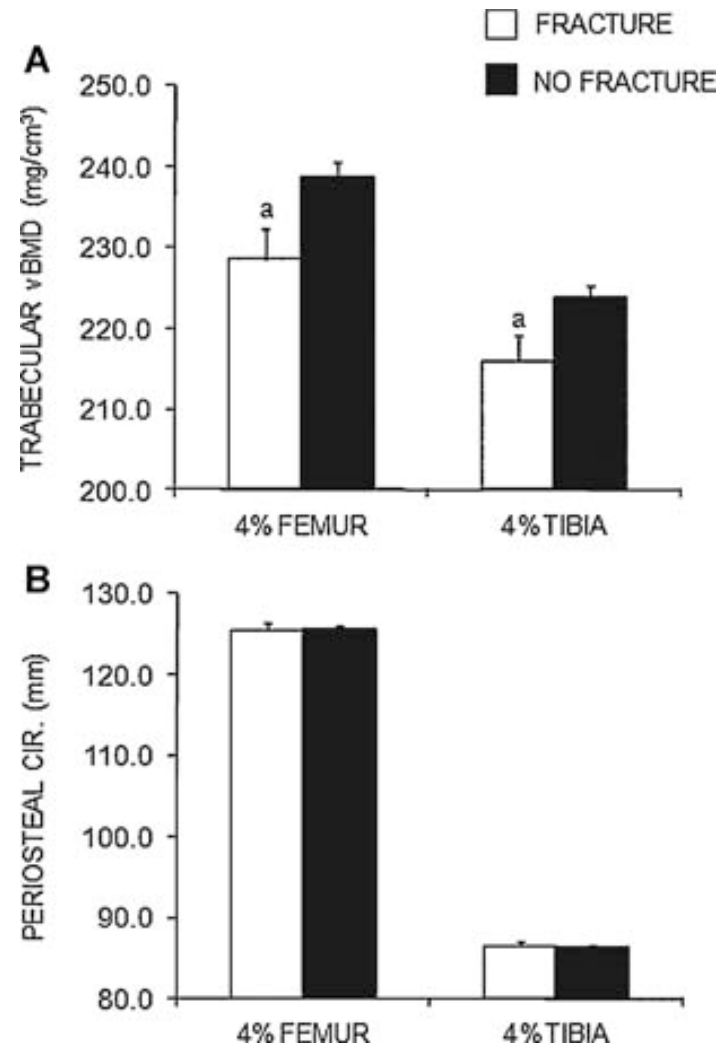
HR-pTAC en extremidad distal de tibia y radio en O.P.I.



Indicaciones Densitometría ósea en Premenopausia

- Existencia de fractura, actual o previa.
- Presencia de una causa de OP secundaria.
- Debe realizarse vDMO (TAC) si existe sospecha de fragilidad ósea y la aDMO es normal.
- En ocasiones puede ser necesario un HR-pTAC (análisis de elementos finitos – ITS..) y/o biopsia para análisis de microestructura.

vDMO y grosor cortical (pTAC) en niñas con fractura previa y DMO no discriminatorio



Estudios complementarios en la OP Premenopáusica

- Hemograma, V de S, PCR.
- Ca, P, PTH, 25(OH)D, Calciuria y remodelado óseo
- FSH, LH, Prolactina, E-2, Progesterona.
- Testosterona.
- Autoanticuerpos (ANAs, A.Reumatoide..).
- Función renal y hepática.
- Función tiroidea (T-4, T-3 y TSH). Cortisol.
- Malabsorción y Enf. Celíaca (antitranspeptidasa)
- Niveles de fármacos, en caso necesario.

Tratamiento de la OP Premenopáusica

- Hay que instaurar tratamiento cuando existe fractura y/o alteración de la microestructura ósea, y no si únicamente hay disminución de DMO.
- En caso de OP secundaria tratar la patología causal y prevenir siempre que sea posible.
- Son beneficiosas las medidas higiénico-dietéticas.
- Es muy importante la replección de vitamina D, para conseguir niveles séricos de 25(OH)D > 30 ng/ml.
- Están contraindicados los SERMs
- Hay que utilizar con prudencia los bifosfonatos, porque atraviesan la placenta, se mantienen en el organismo largo tiempo y se ha constatado teratogenia en ratas.

TABLE 1. SECONDARY CAUSES OF OSTEOPOROSIS FOUND

<i>Secondary cause</i>	<i>Number affected</i>	<i>% of total (n = 61)^a</i>
Idiopathic—no cause found	24	39
History of amenorrhea > 6 months	21	34
Anorexia nervosa	10	
Depot medroxyprogesterone acetate	2	
Medications to suppress pituitary function	1	
Glucocorticoid exposure	8	13
Rheumatologic disease	3	
Organ transplant (liver, lung, kidney)	3	
Celiac disease (based on serologic study)	6	10
Medications to suppress pituitary function (<6 months)	1	2
Hyperparathyroidism	3	5
Seizure medication use	2	3
Hyperthyroidism	1	2
Hereditary exostosis	1	2

^aPercent of total is >100%. Many women had more than one secondary cause (e.g., some women with celiac disease or glucocorticoid exposure also had amenorrhea).

TABLE 1. SECONDARY CAUSES OF OSTEOPOROSIS FOUND

<i>Secondary cause</i>	<i>Number affected</i>	<i>% of total (n = 61)^a</i>
Idiopathic—no cause found	24	39
History of amenorrhea > 6 months	21	34
Anorexia nervosa	10	
Depot medroxyprogesterone acetate	2	
Medications to suppress pituitary function	1	
Glucocorticoid exposure	8	13
Rheumatologic disease	3	
Organ transplant (liver, lung, kidney)	3	
Celiac disease (based on serologic study)	6	10
Medications to suppress pituitary function (<6 months)	1	2
Hyperparathyroidism	3	5
Seizure medication use	2	3
Hyperthyroidism	1	2
Hereditary exostosis	1	2

^aPercent of total is >100%. Many women had more than one secondary cause (e.g., some women with celiac disease or glucocorticoid exposure also had amenorrhea).

TABLE 2. FRACTURES SUSTAINED

<i>Fracture type</i>	<i>Number of women</i>	<i>% of total with fractures (n = 29)^a</i>
Vertebral	5	17
Rib	2	7
Hip	4	14
Pelvic	3	10
Forearm	8	28
Elbow	2	7
Tibia, ankle, foot	13	45

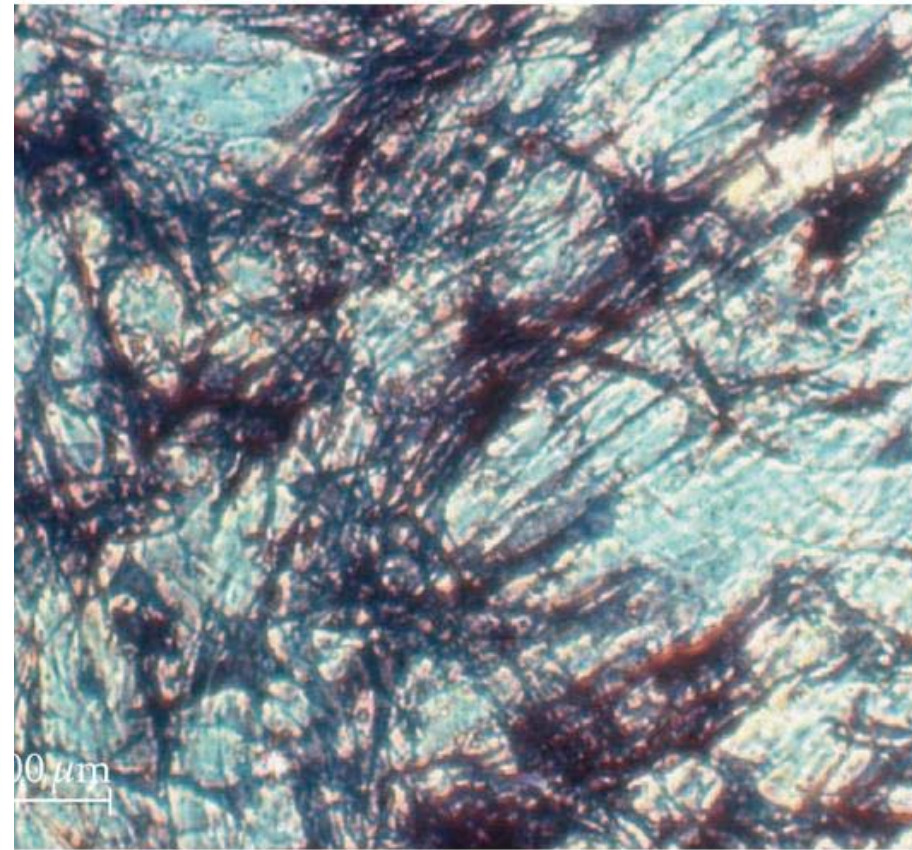
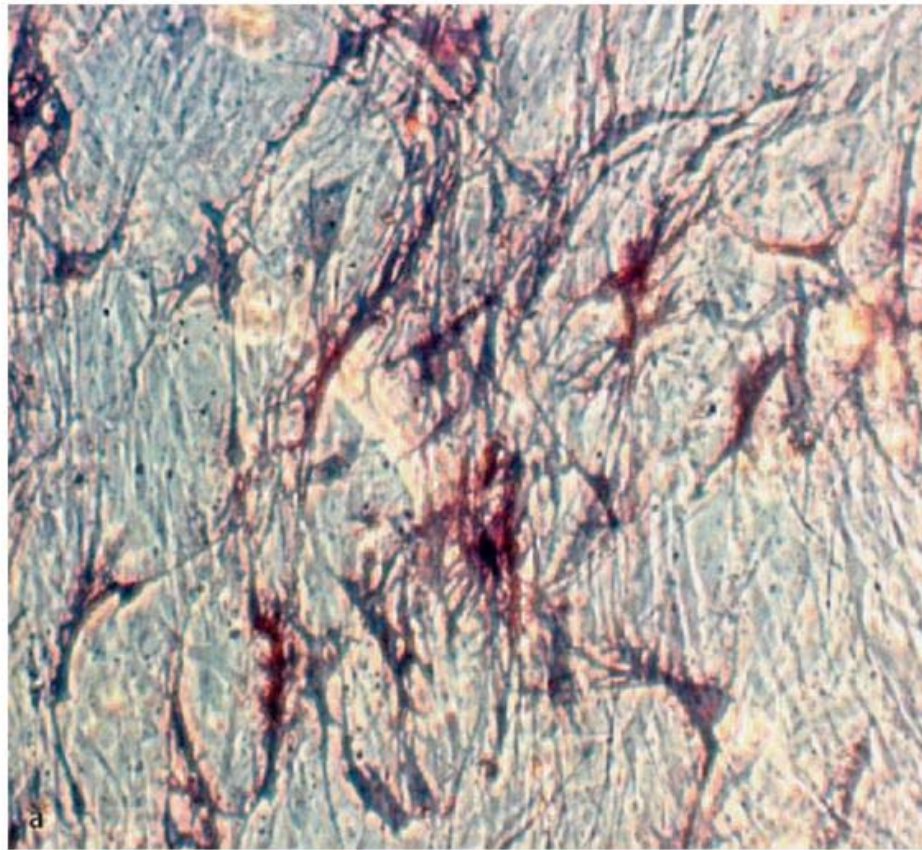
^aNote that 52% of women had sustained multiple fractures.

TABLE 3. COMPARISON OF SUBJECTS WITH AND WITHOUT A HISTORY OF FRACTURES AND WITH AND WITHOUT A KNOWN SECONDARY CAUSE

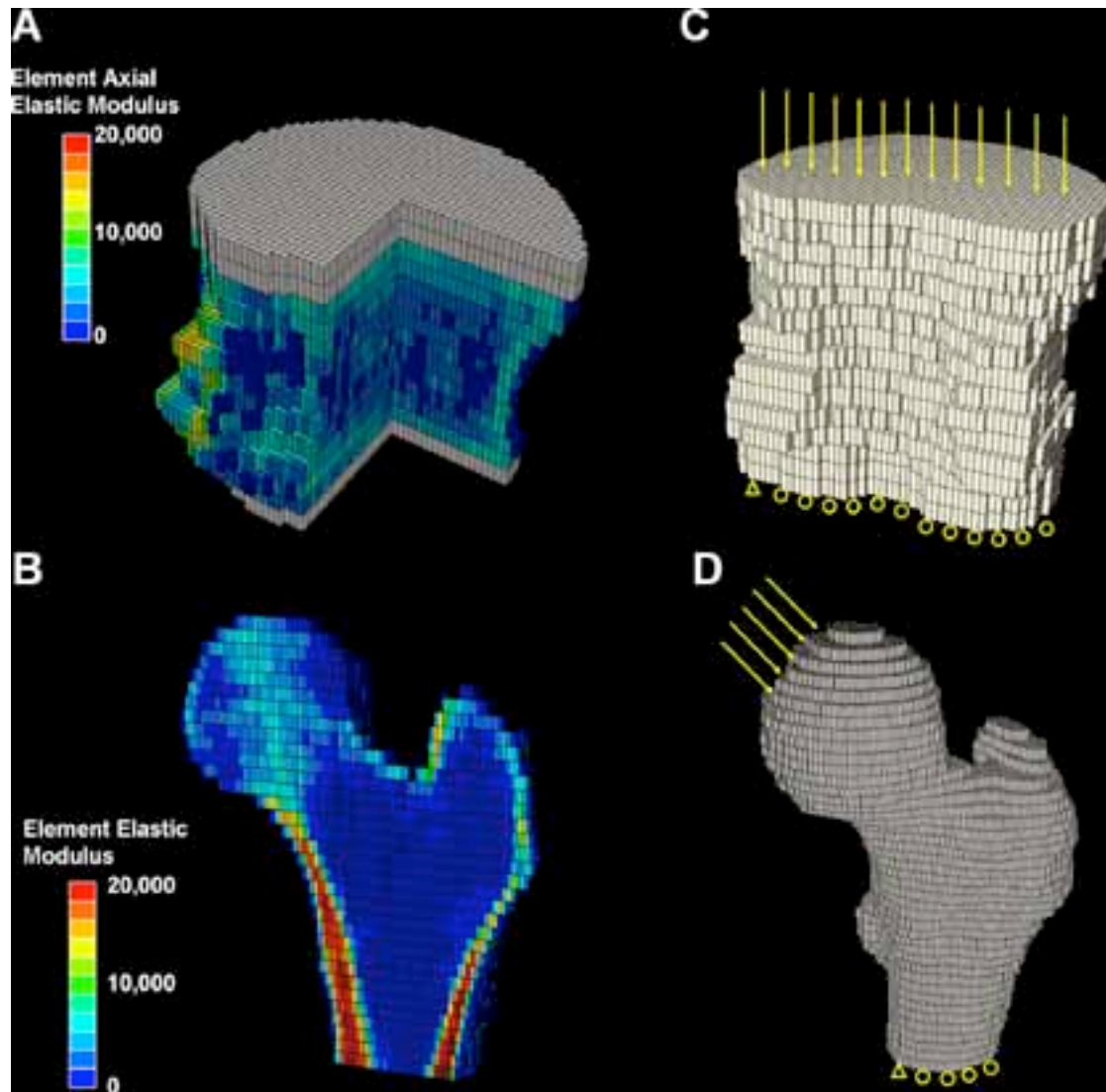
	<i>History of fracture</i>		<i>No history of fracture</i>		<i>p</i> ^a
	<i>Known secondary cause</i> n = 15 <i>Mean ± SD</i>	<i>IOP</i> n = 14 <i>Mean ± SD</i>	<i>Known secondary cause</i> n = 22 <i>Mean ± SD</i>	<i>IOP</i> n = 10 <i>Mean ± SD</i>	
Race: % Caucasian	100%	93%	91%	90%	NS
Age (years)	37 ± 8	37 ± 7	33 ± 8	45 ± 4	0.001
Height (cm)	165.3 ± 5.8	161.5 ± 7.4	159.1 ± 9.8	159.8 ± 5.1	NS
Weight (kg)	56.5 ± 8.5	55.5 ± 10.7	53.9 ± 13.7	49.5 ± 7.3	NS
BMI (kg/m ²)	20.7 ± 3.0	21.6 ± 2.1	21.1 ± 4.4	19.4 ± 2.7	NS
Menarchal age (years)	14.5 ± 1.9	13.0 ± 1.3	13.1 ± 1.4	13.8 ± 1.8	0.03
Parity (no. of live births)	0.7 ± 1.2	0.9 ± 1.1	0.5 ± 1.4	2.6 ± 3.1	0.02
Family history of osteoporosis (%)	60%	64%	48%	60%	NS
Calcium supplement use (%)	87%	86%	73%	90%	NS
Vitamin D supplements (%)	64%	93%	62%	80%	NS
Oral bisphosphonates, current or past (%)	33%	43%	41%	60%	NS
Serum 25(OH) vitamin D (ng/mL)	31 ± 9	36 ± 9	34 ± 23	30 ± 6	NS
Mean BMD Z score					
Lumbar spine	-2.11 ± 0.99	-1.61 ± 1.11	-2.61 ± 0.65	-1.54 ± 0.80	0.006
Total hip	-0.98 ± 0.96	-1.62 ± 0.76	-2.00 ± 0.61	-1.29 ± 0.74	0.005
Femoral neck	-1.29 ± 0.83	-1.60 ± 0.66	-1.94 ± 0.67	-1.17 ± 0.81	0.03
Distal radius	0.03 ± 0.87	-0.14 ± 1.06	-0.91 ± 1.03	-0.72 ± 1.28	NS
Mean BMD T score					
Lumbar spine	-2.33 ± 0.93	-1.85 ± 0.96	-2.61 ± 0.69	-2.27 ± 0.66	NS
Total hip	-1.35 ± 1.07	-1.89 ± 0.79	-2.11 ± 0.54	-1.83 ± 0.60	NS
Femoral neck	-1.69 ± 0.88	-1.90 ± 0.70	-2.06 ± 0.53	-1.86 ± 0.75	NS
Distal radius	-0.16 ± 0.84	-0.65 ± 1.30	-1.01 ± 1.01	-1.03 ± 1.05	NS

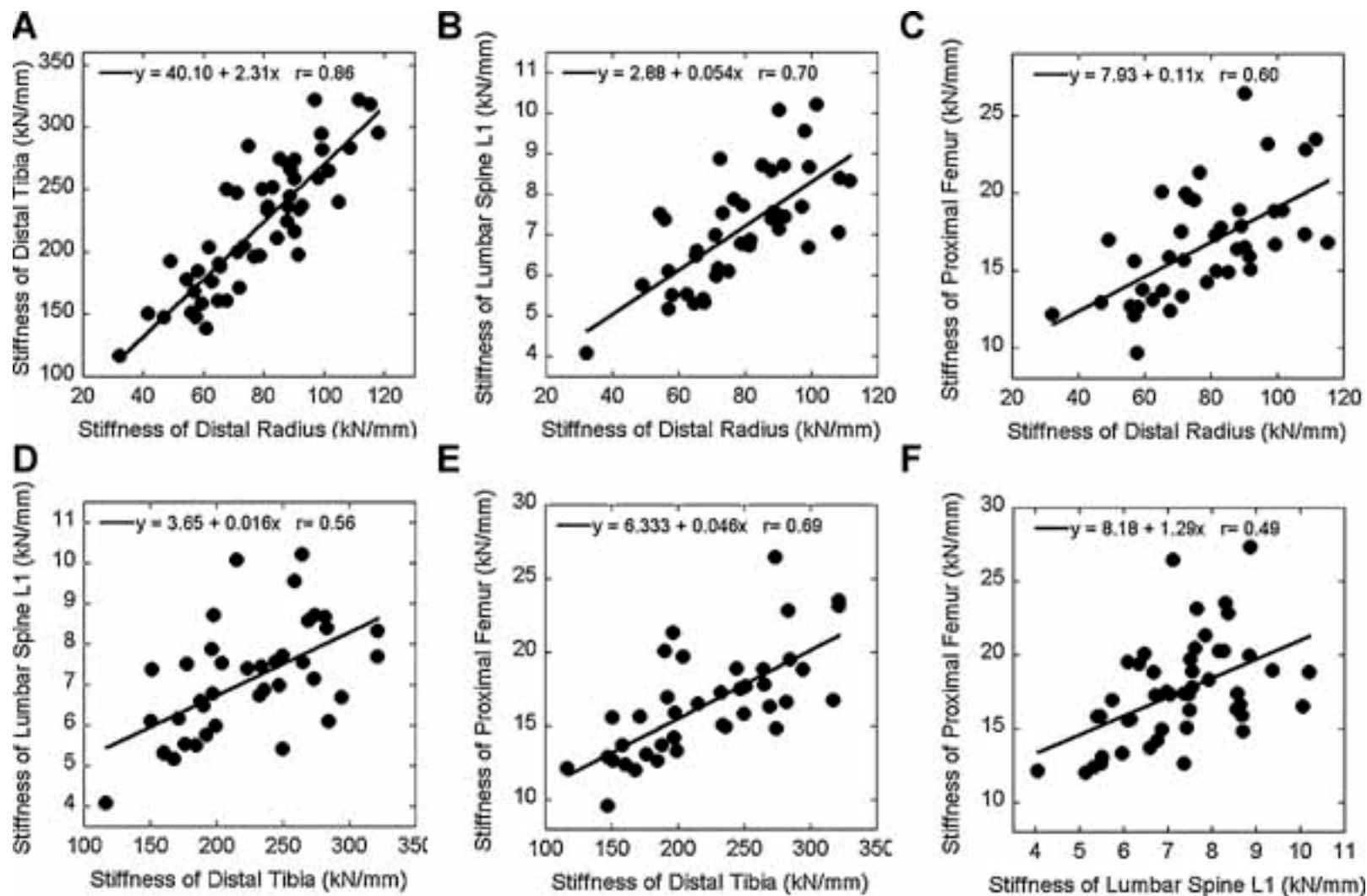
^aOverall differences among the four groups: comparisons based on ANOVA models for continuous variables and Fisher's exact test for categorical variables.

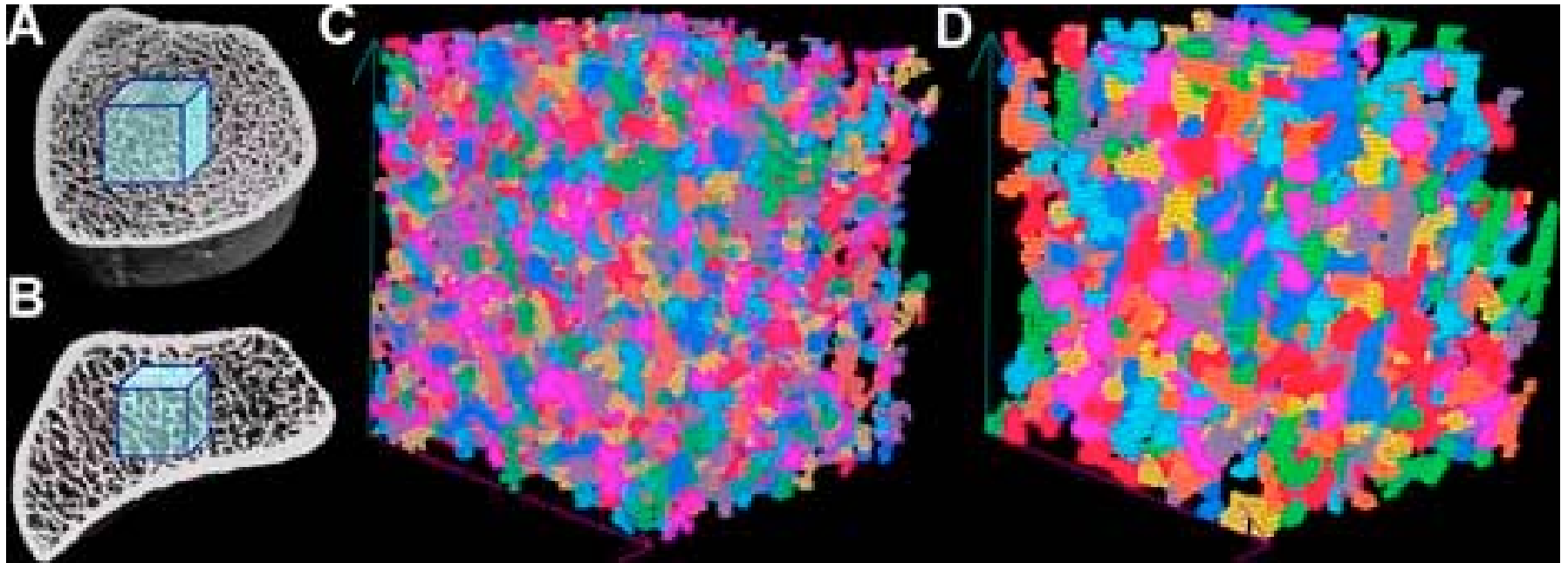
Acción de E-2 y E-2+P sobre la producción de F.A. en cultivos de Obs humanos

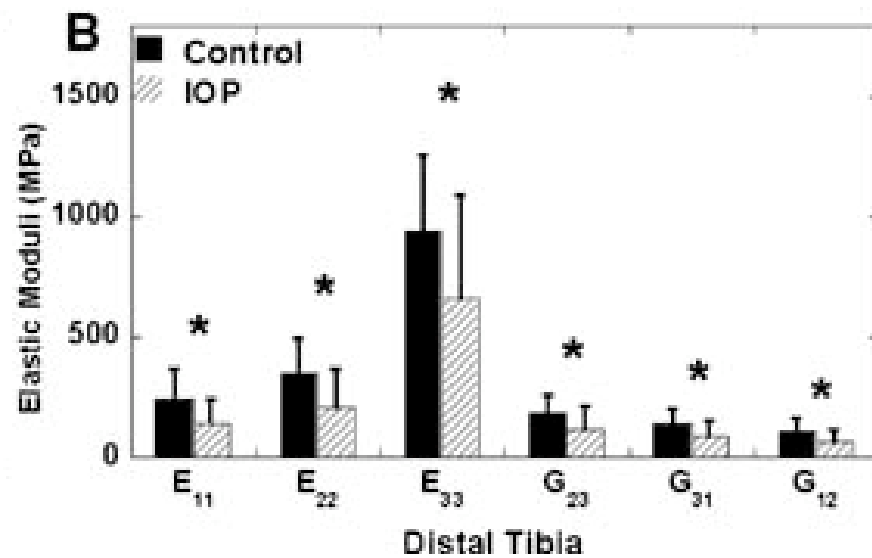
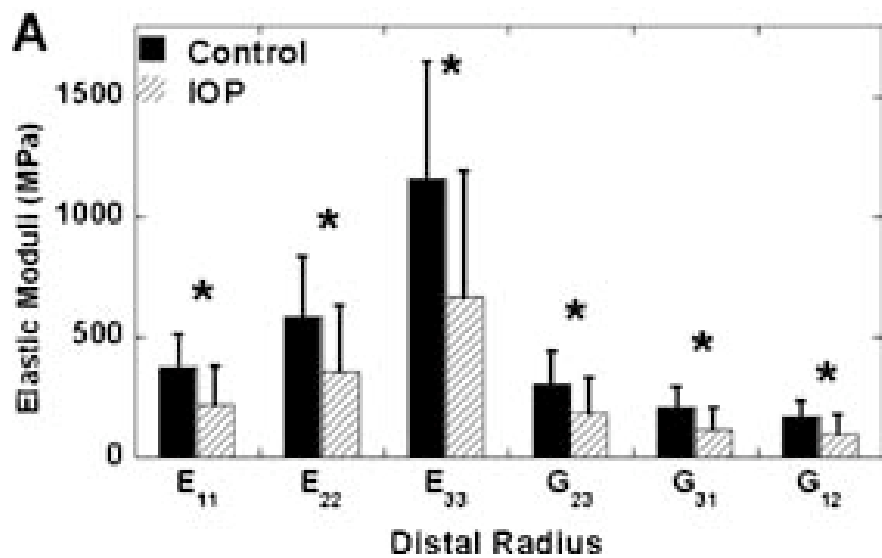


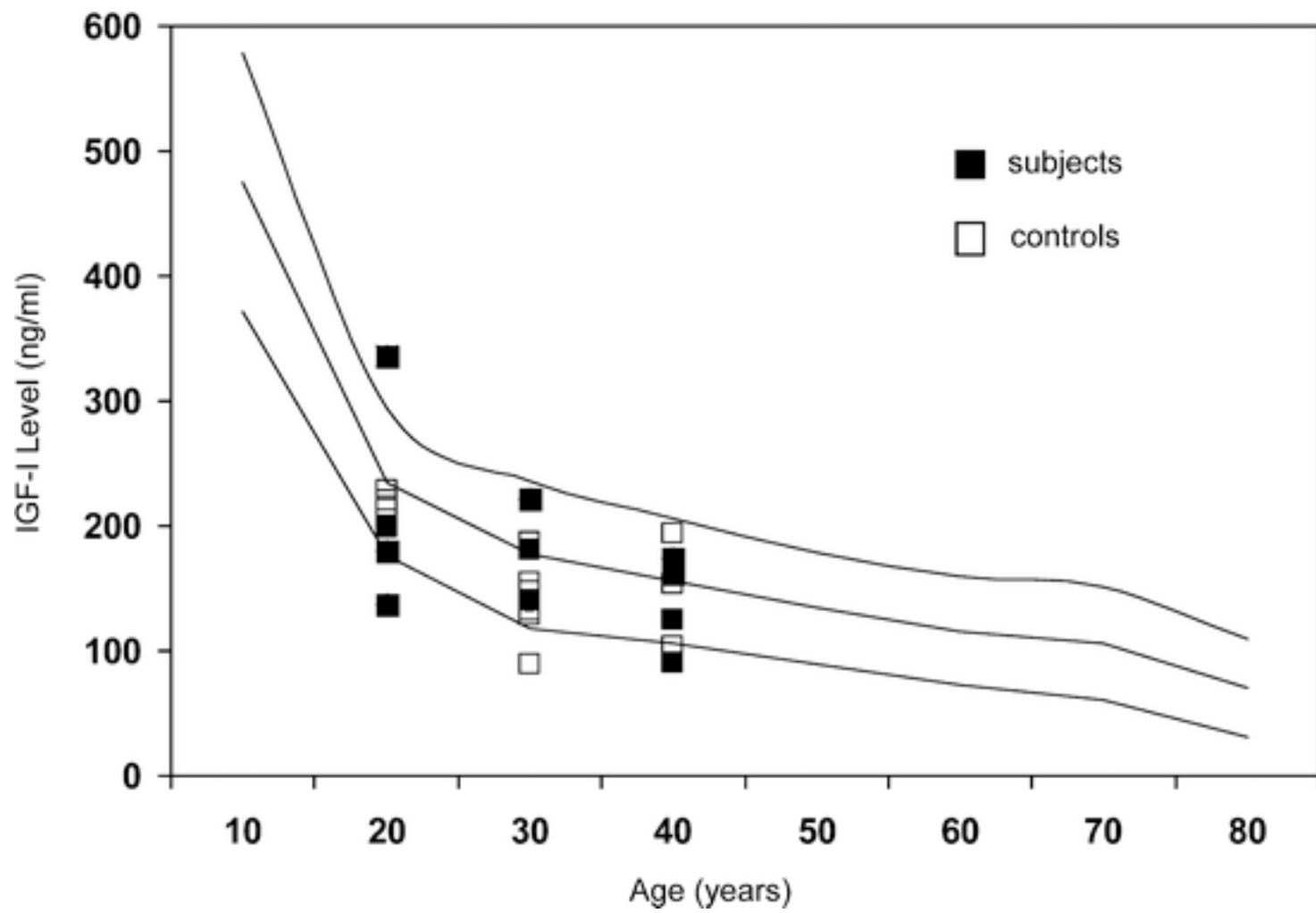
- V. Seifert-Klauss et al: Progesterone and Bone. J. Osteoporosis 2010; on line 31 October

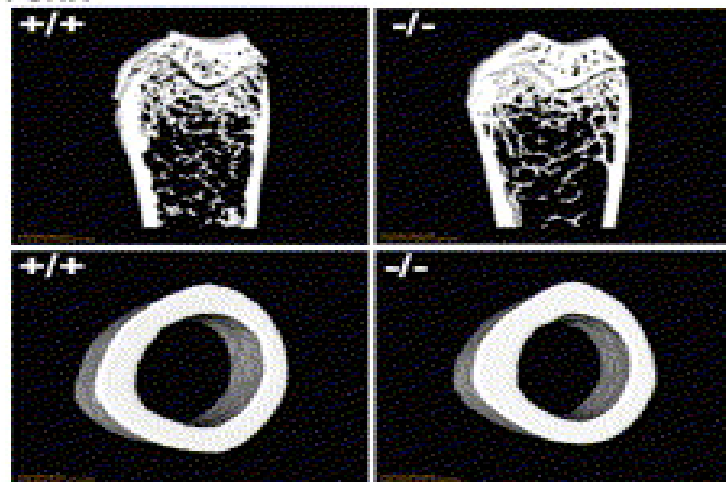
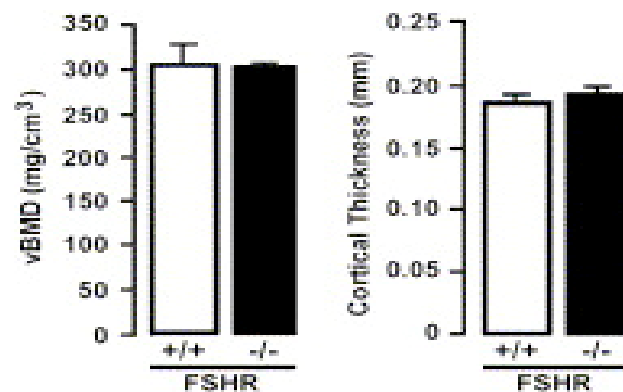
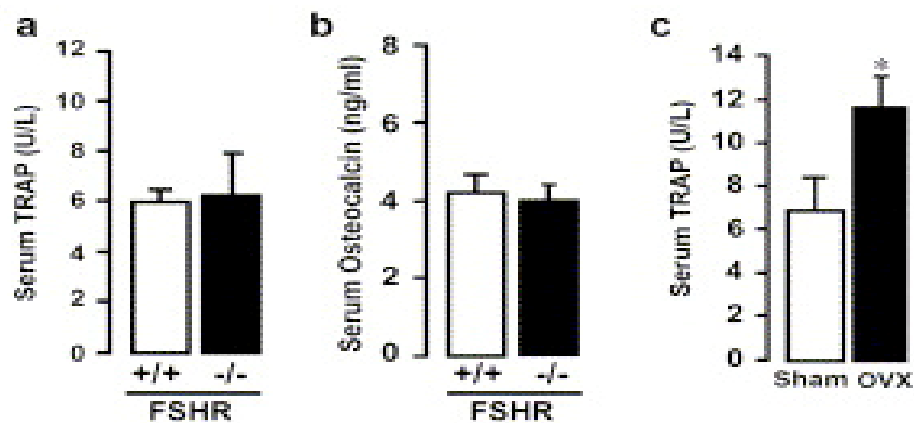
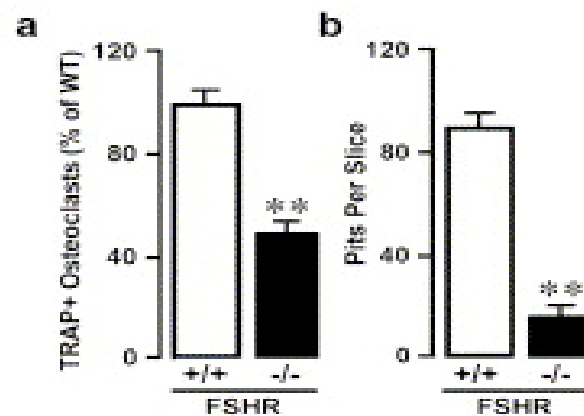
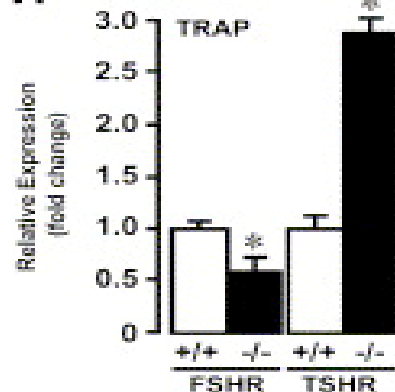
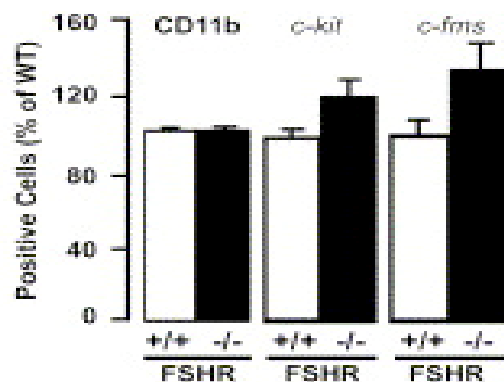
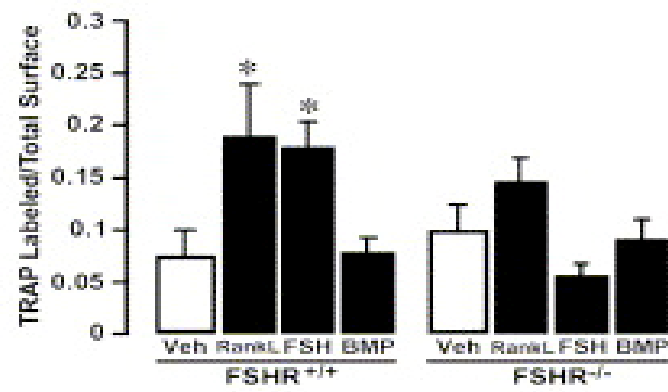




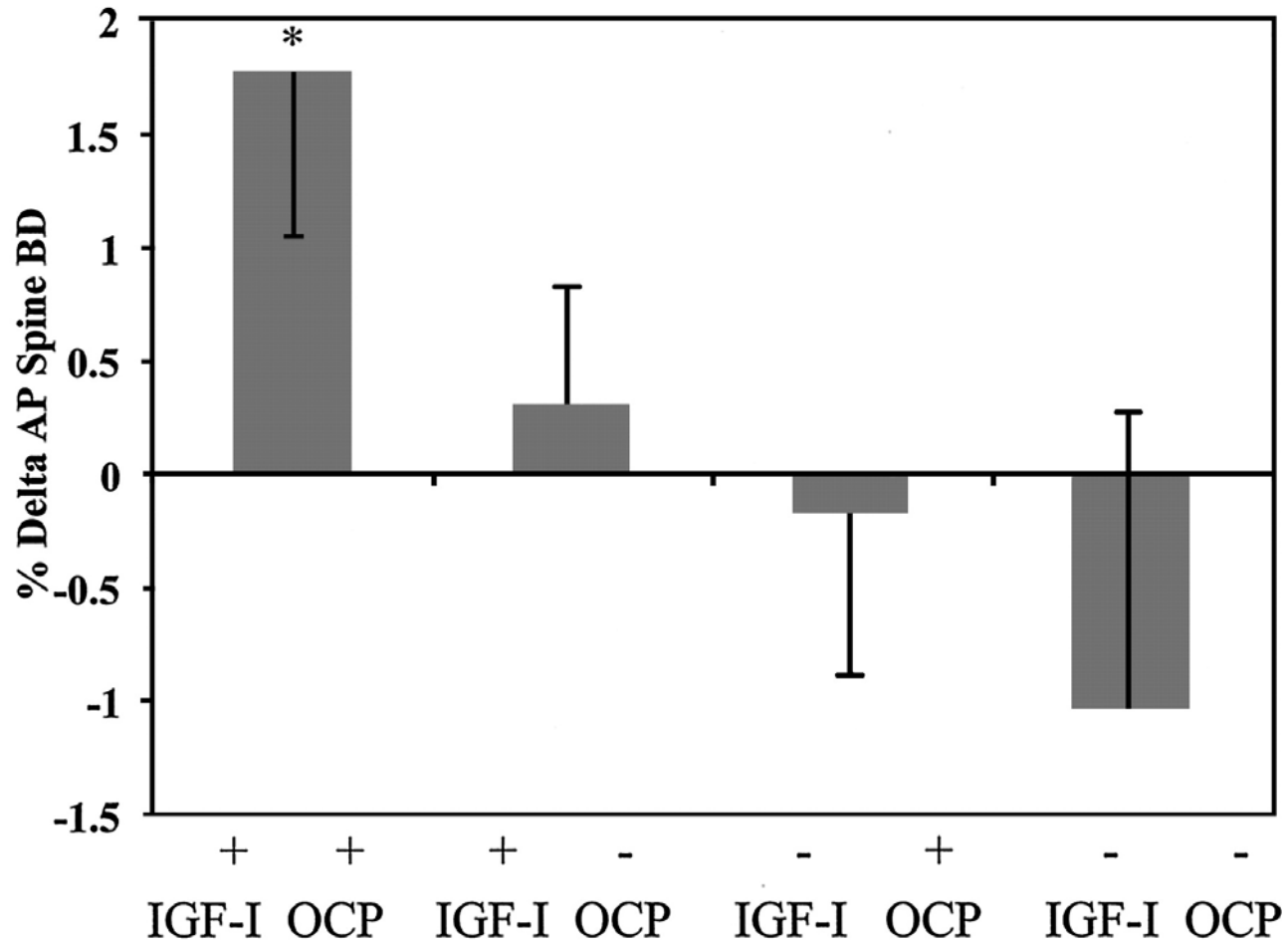


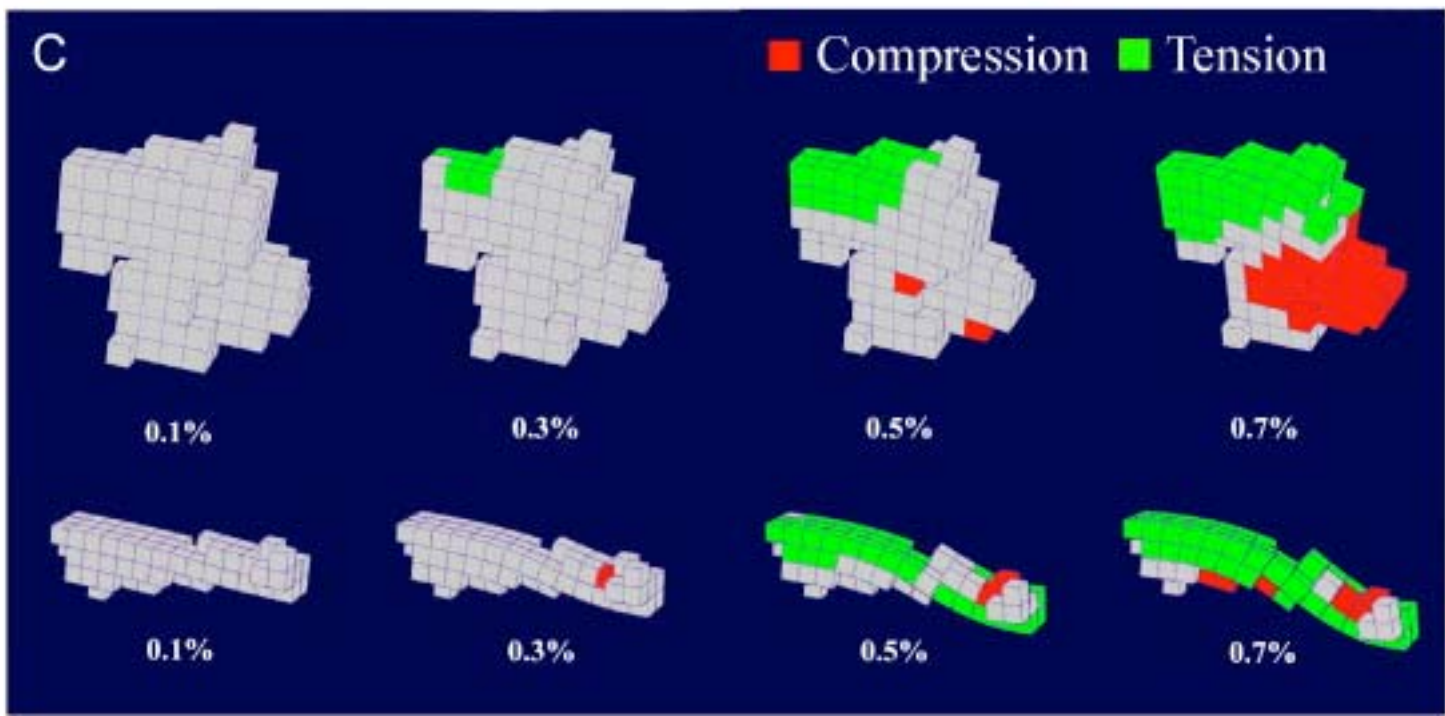
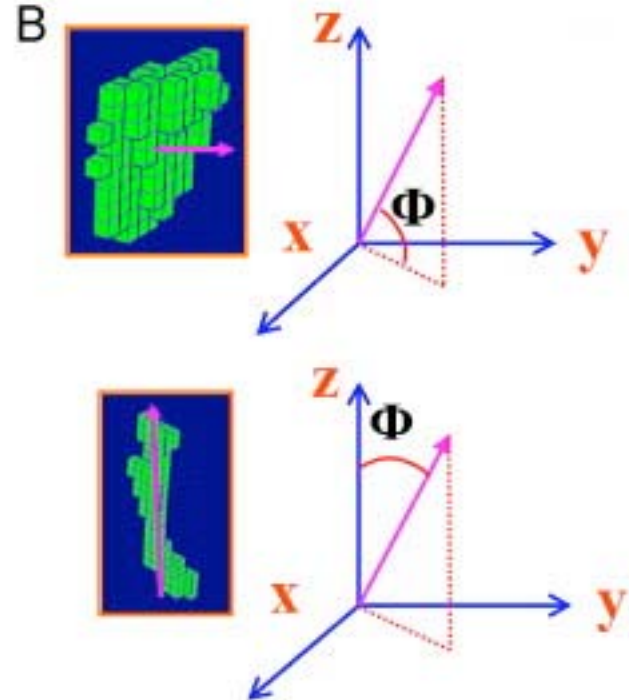
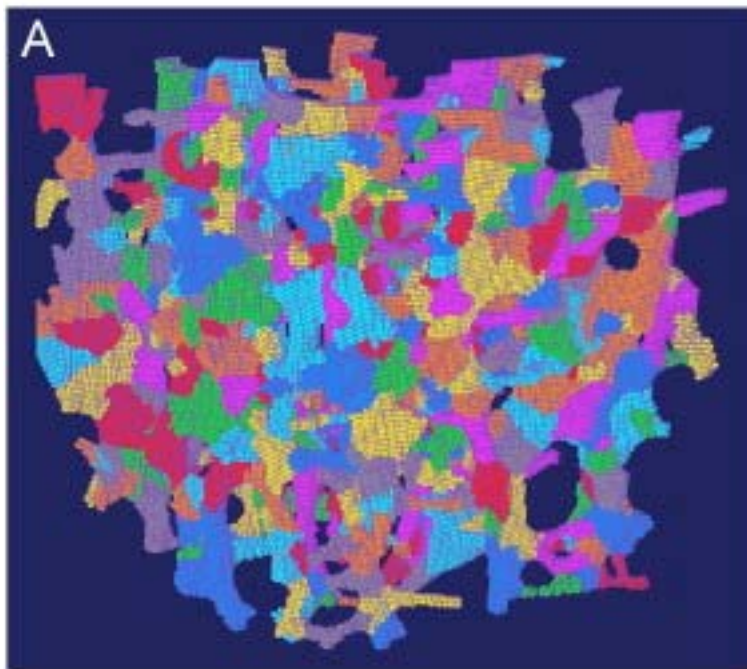


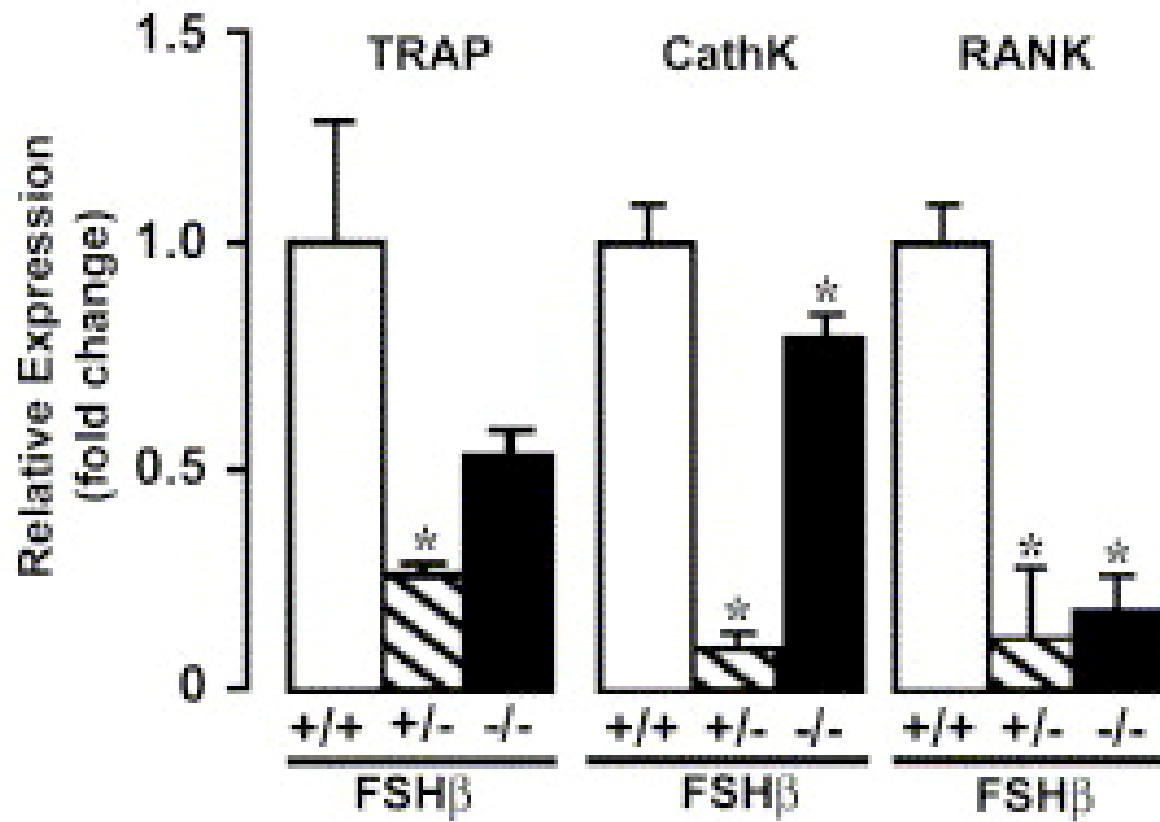


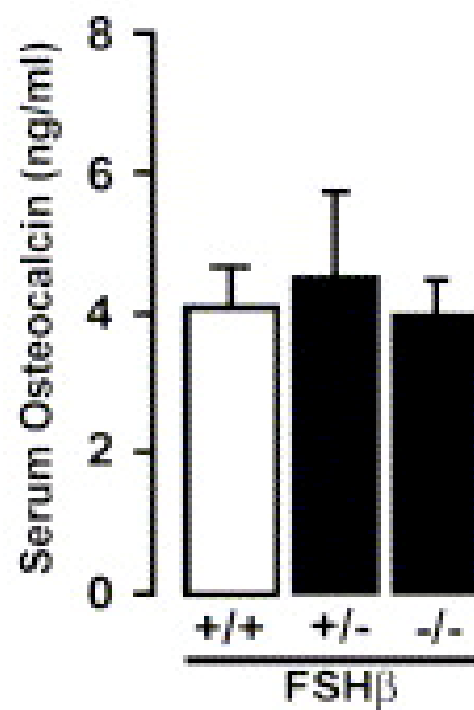
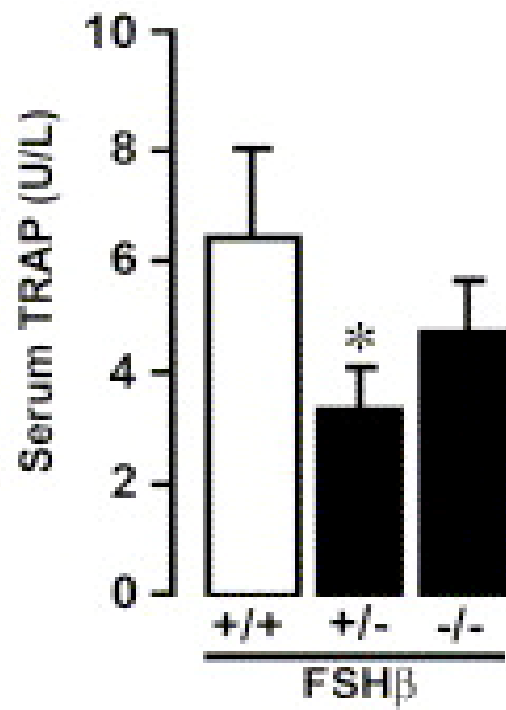
D FSHR**E****F****G****H****I****J**

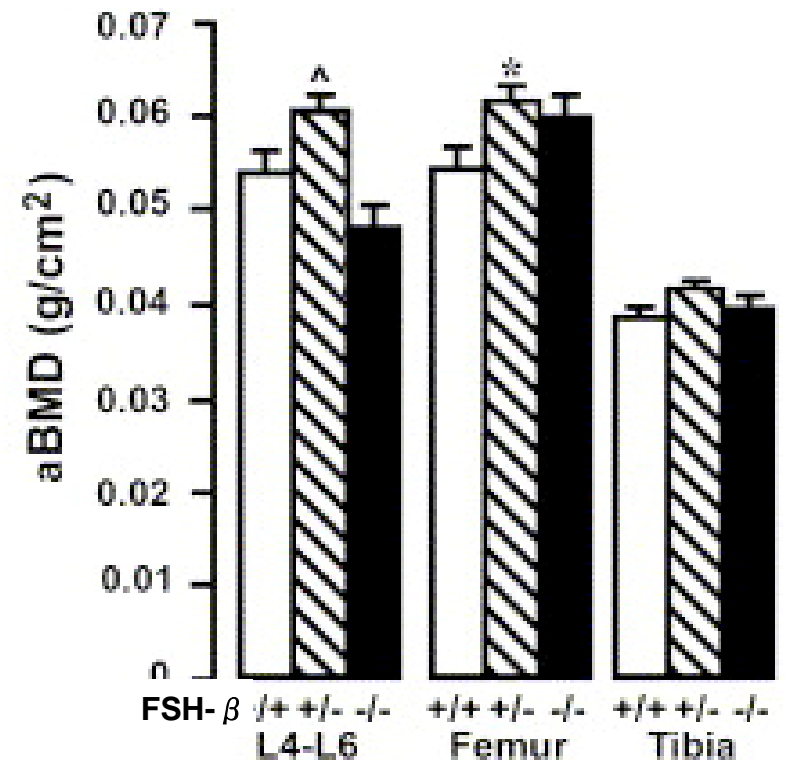
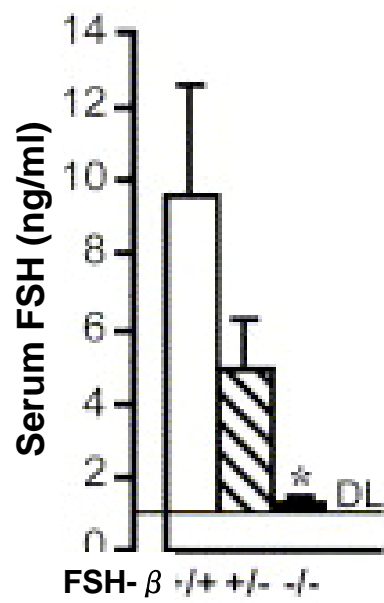
Anorexia Nerviosa: respuesta de la masa ósea a IGF-1 y/o terapia hormonal



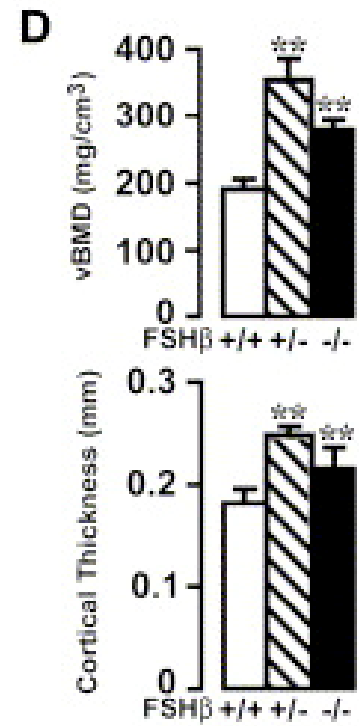
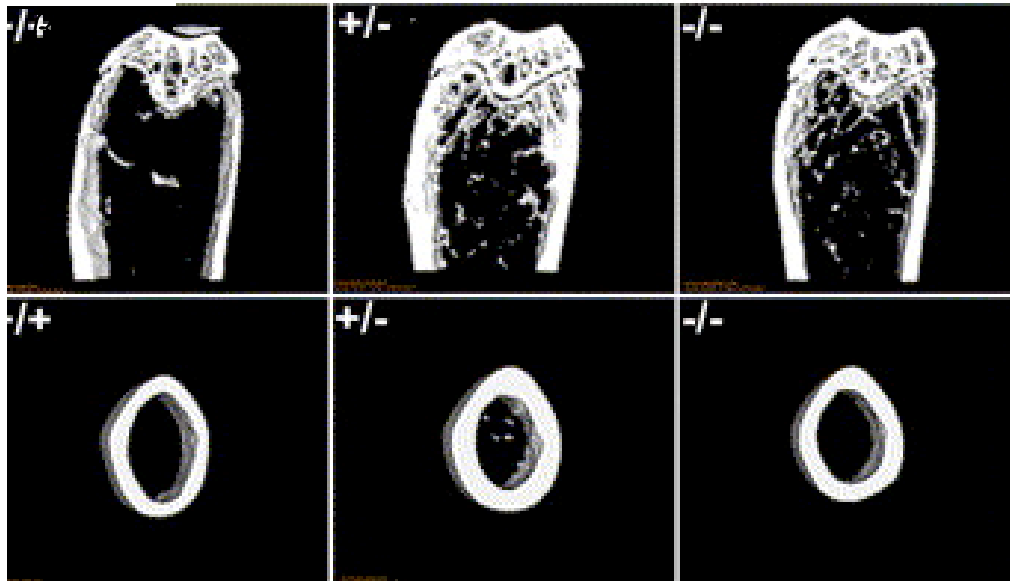








FSH-



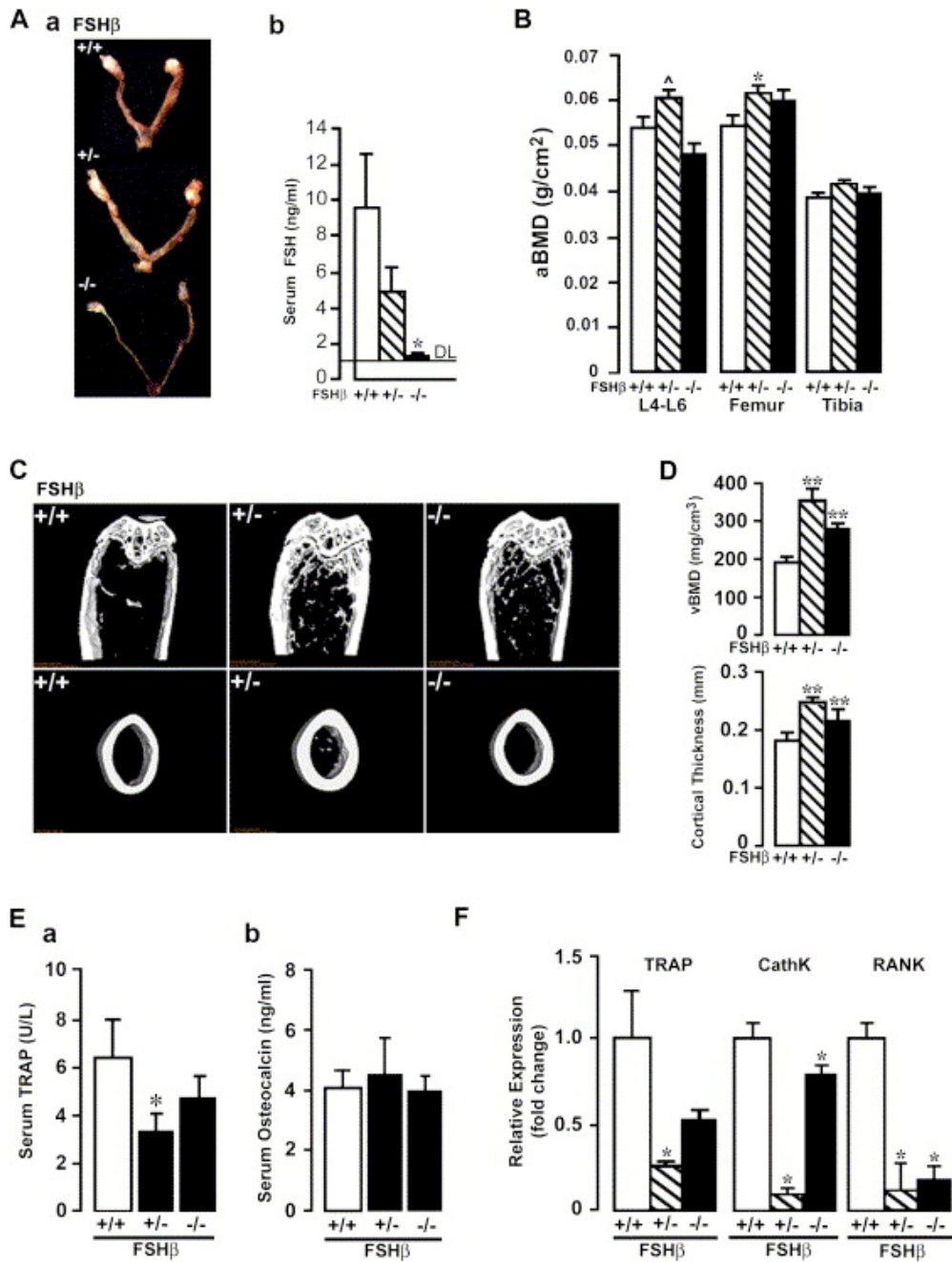
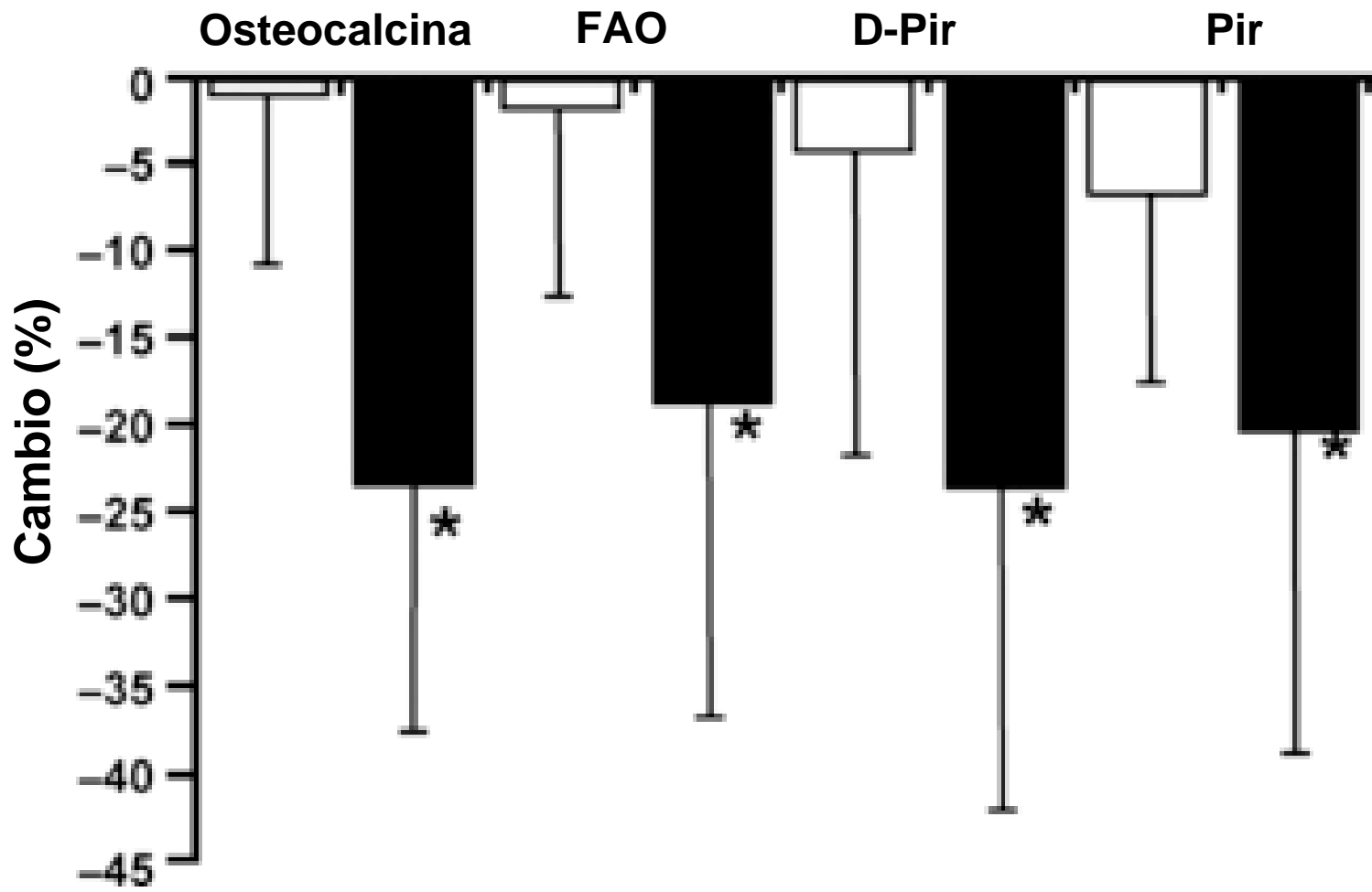


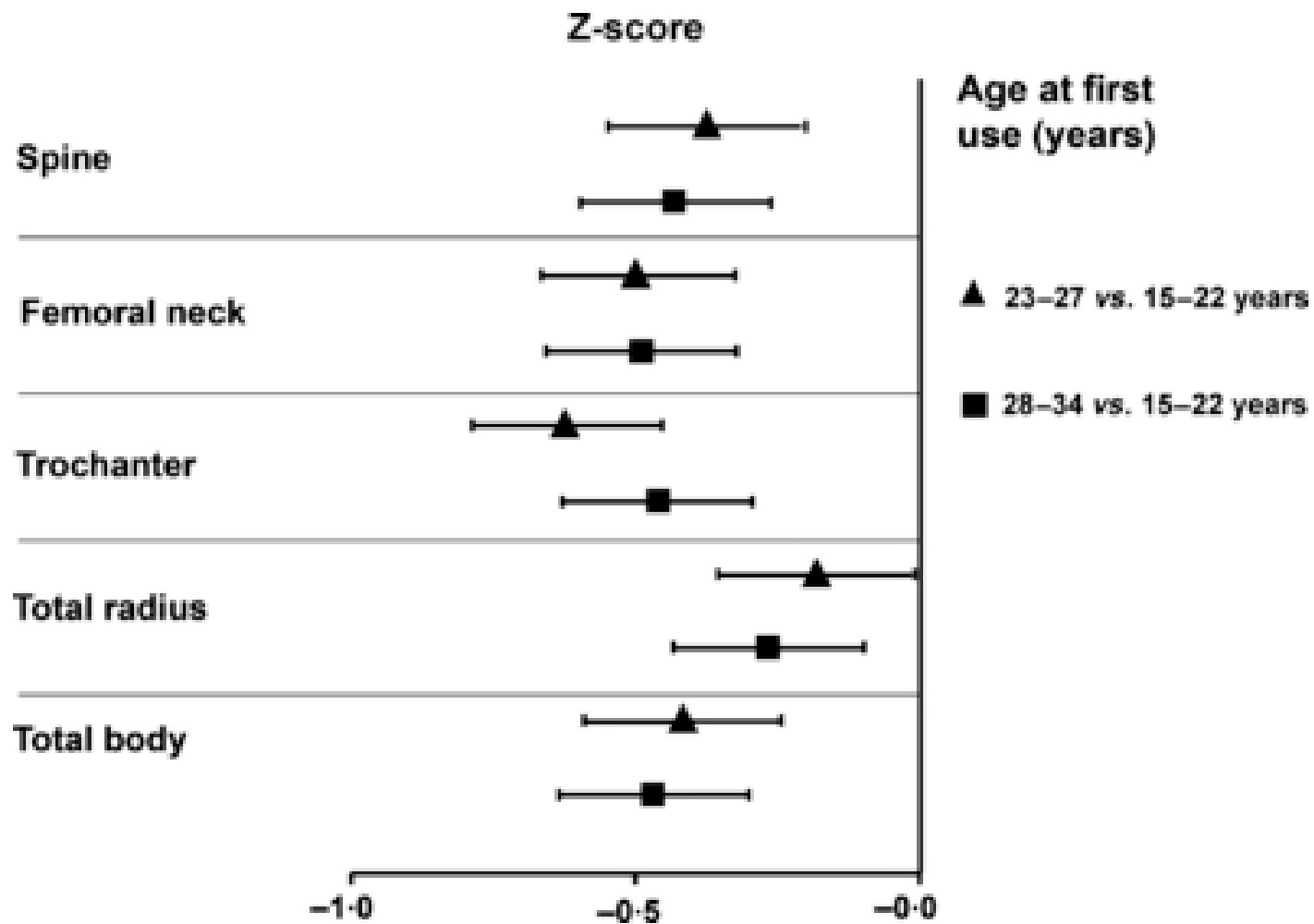
Table 2.

Fractures Sustained

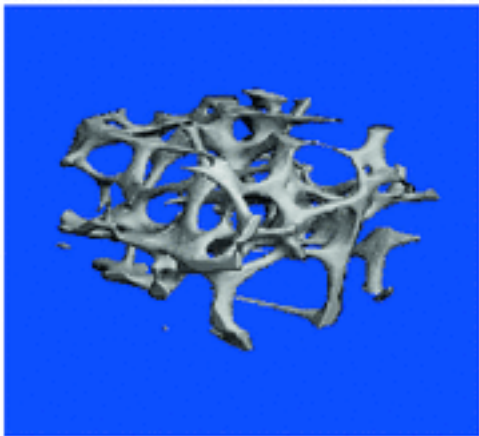
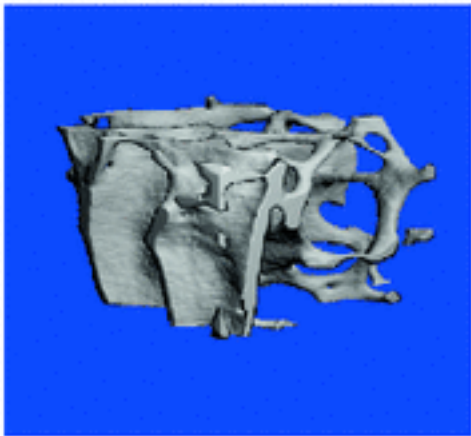
Fracture type	Number of women	% of total with fractures (n = 29) ^a
Vertebral	5	17
Rib	2	7
Hip	4	14
Pelvic	3	10
Forearm	8	28
Elbow	2	7
Tibia, ankle, foot	13	45

^aNote that 52% of women had sustained multiple fractures.

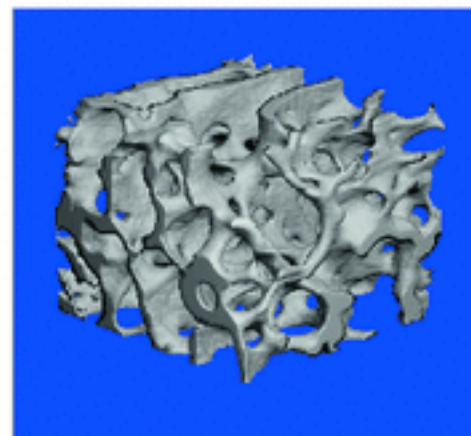
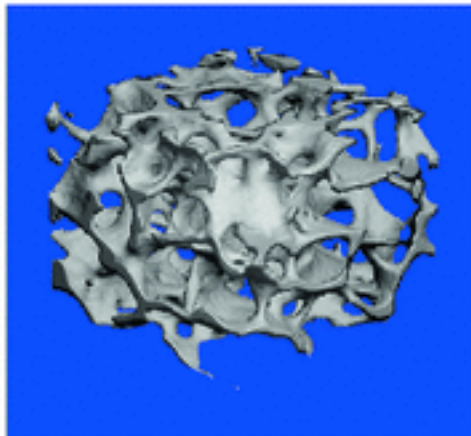




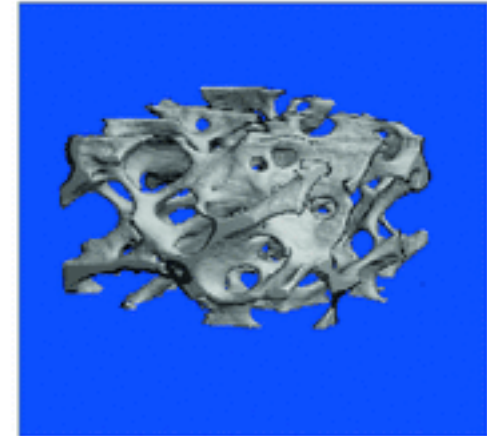
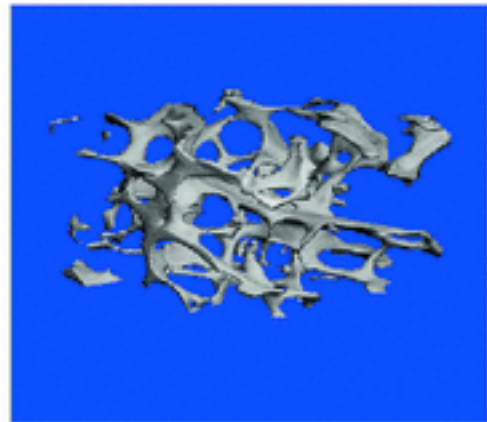
structure model index
(SMI)

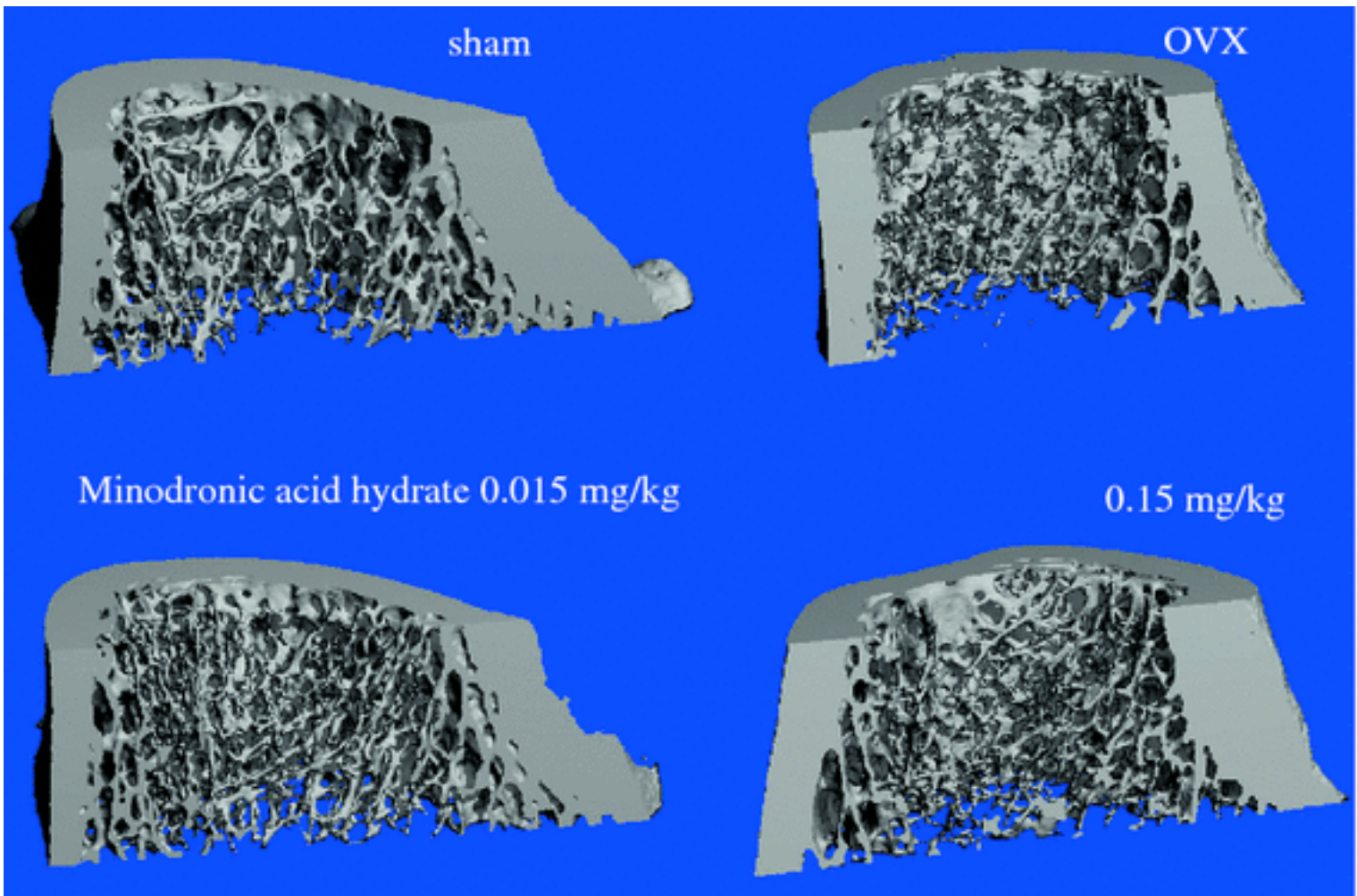


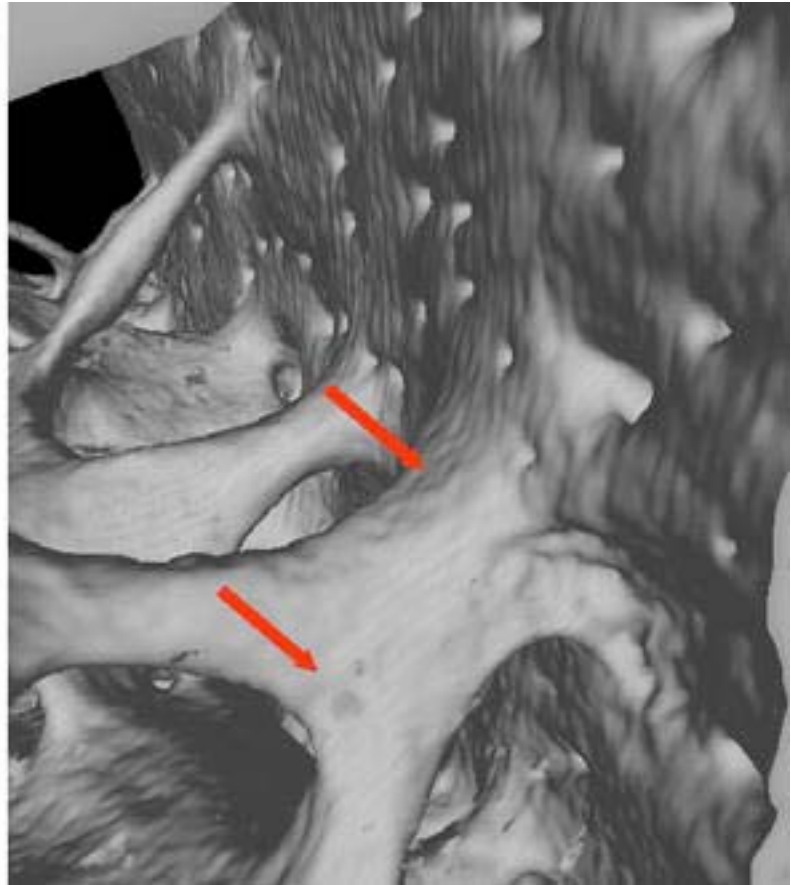
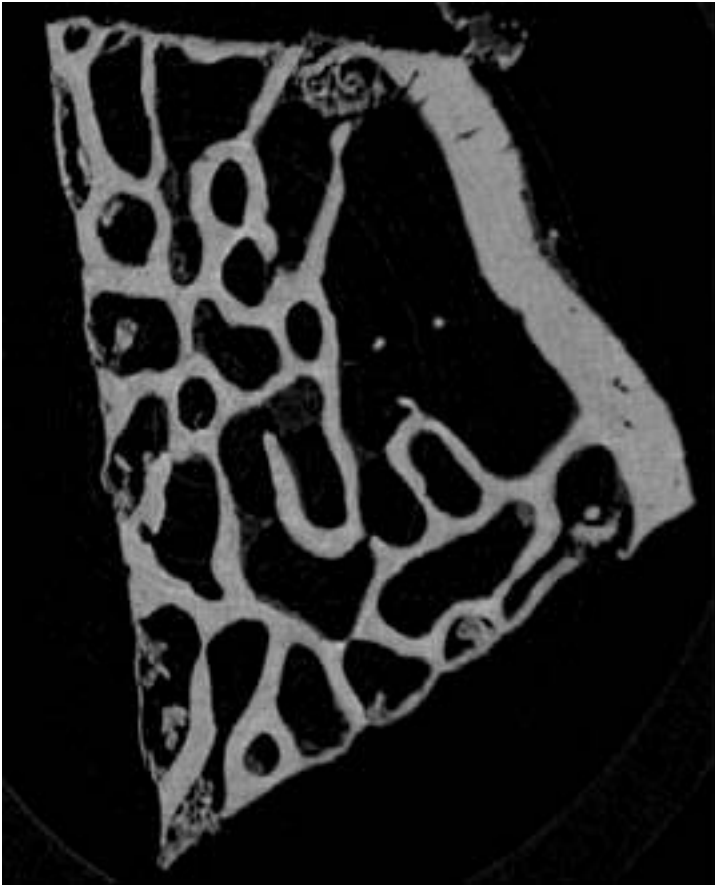
degree of anisotropy
(DA)



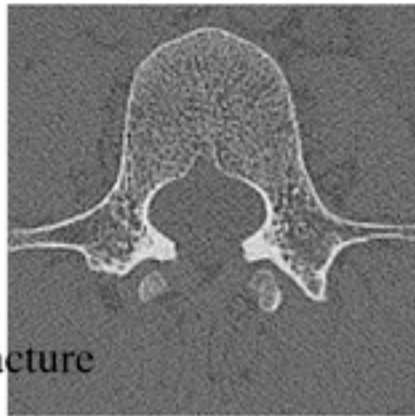
Connectivity density



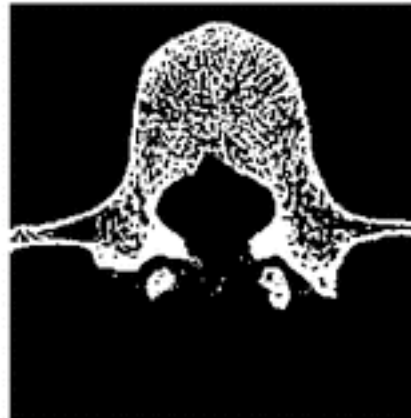




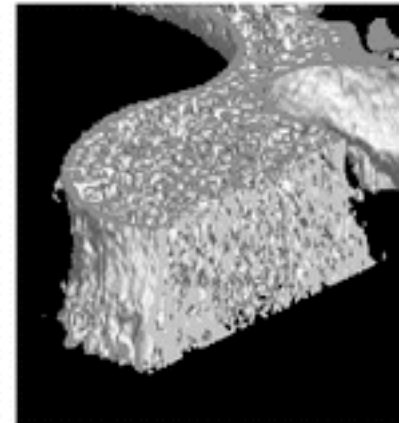
original 2D image



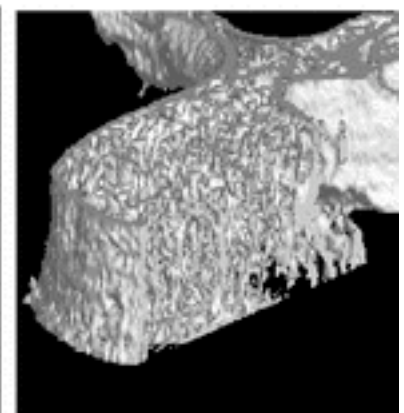
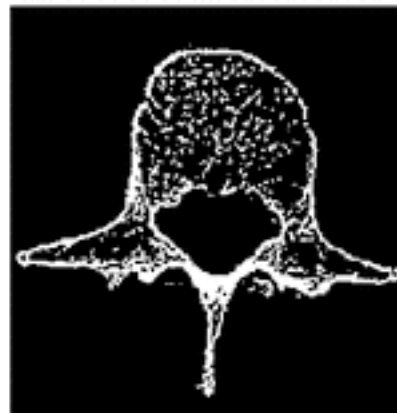
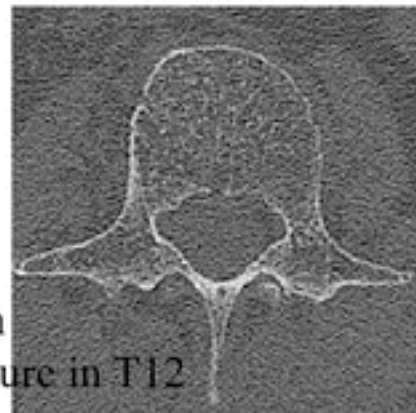
binarized 2D image



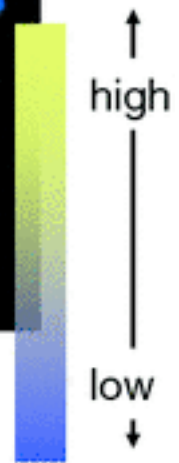
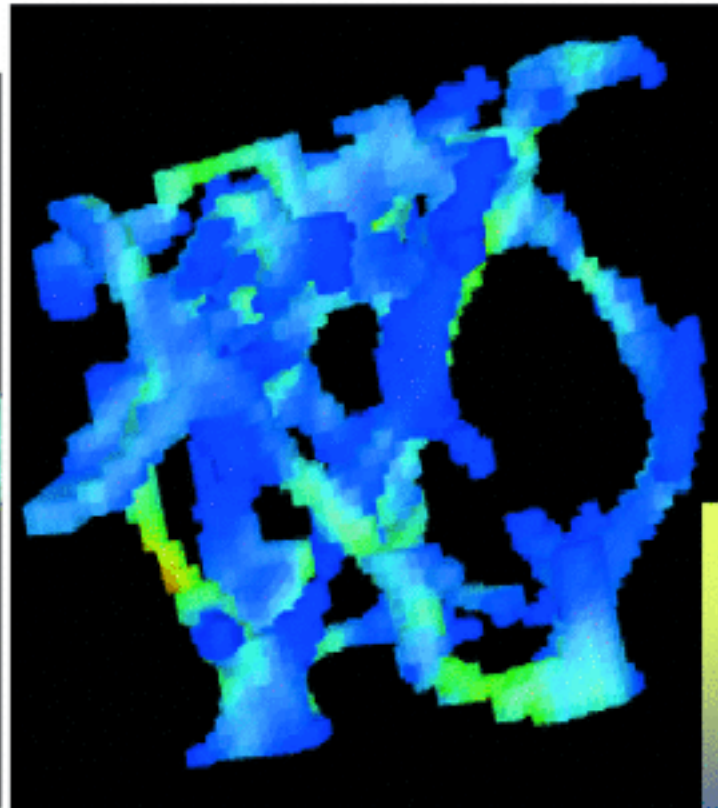
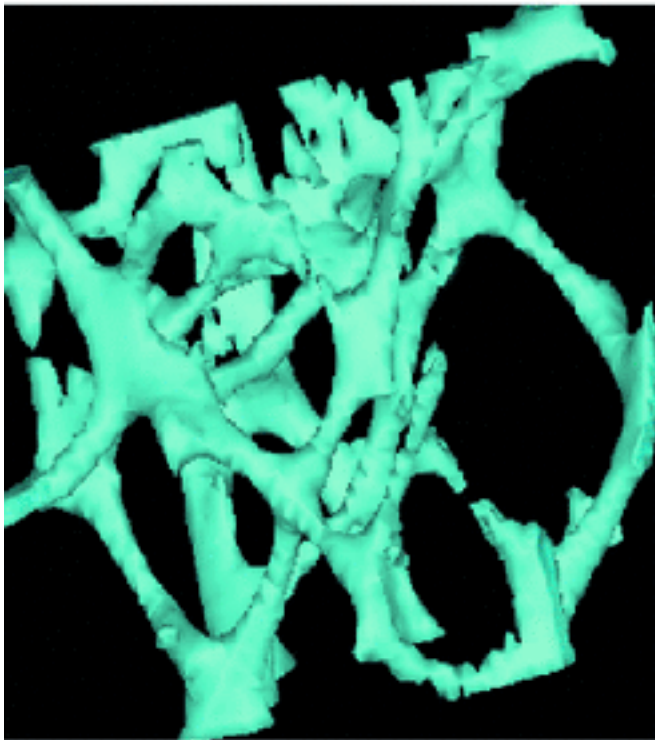
3D image

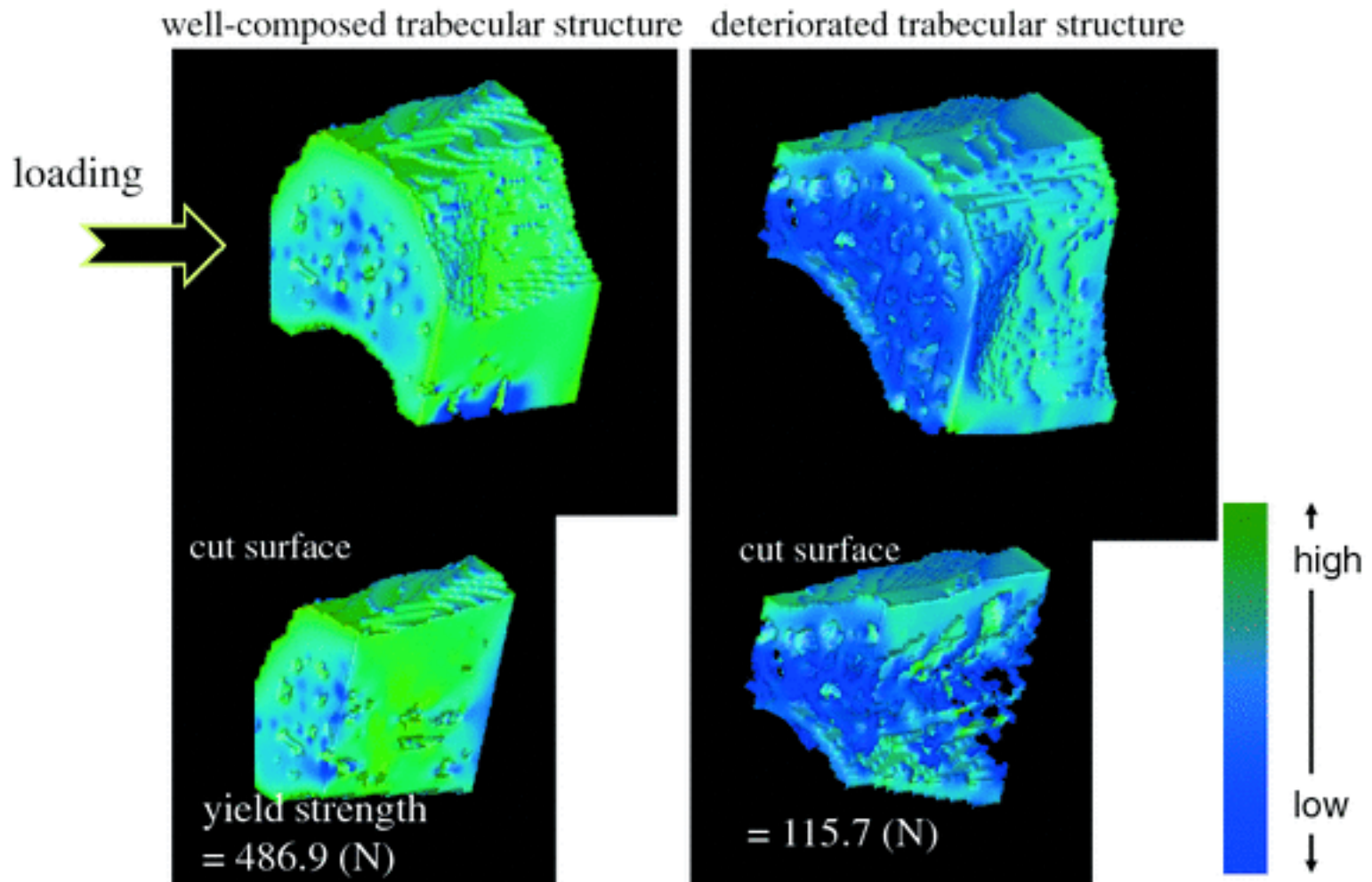


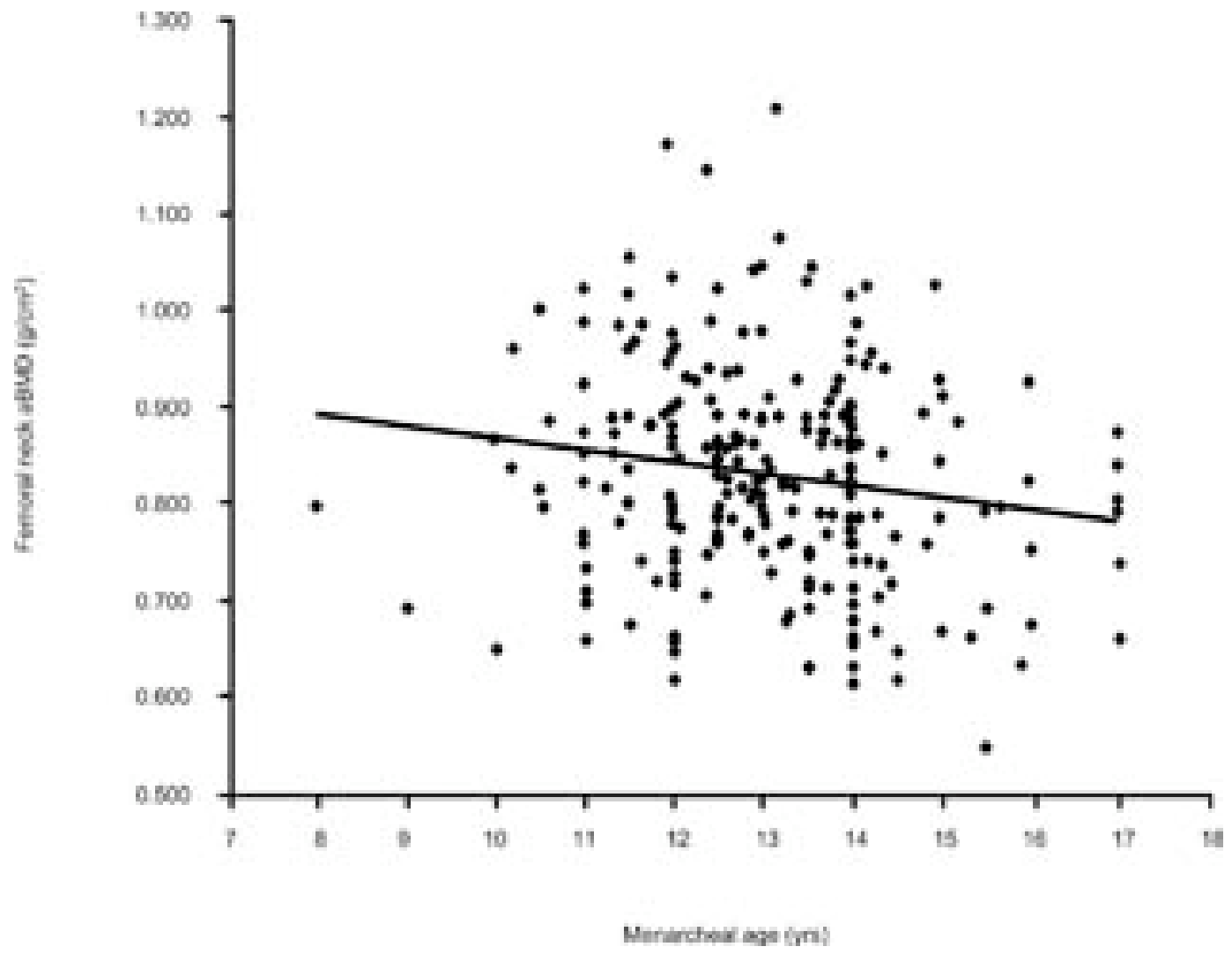
62-year-old woman
without vertebral fracture

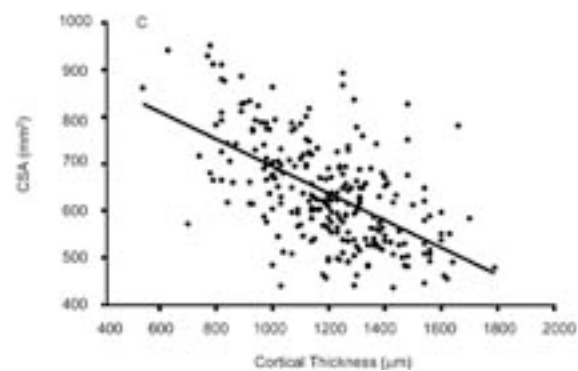
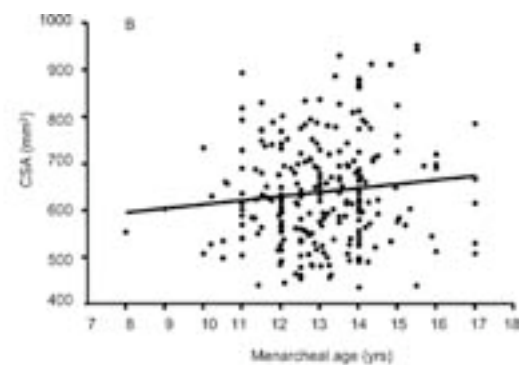
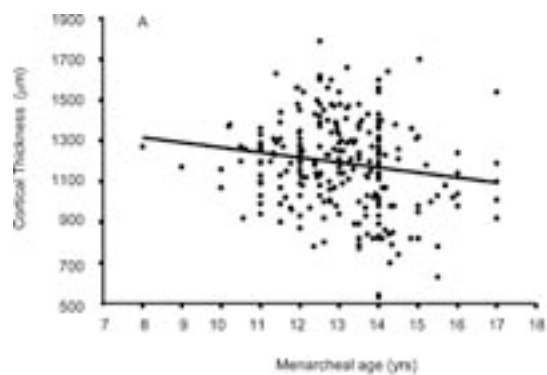


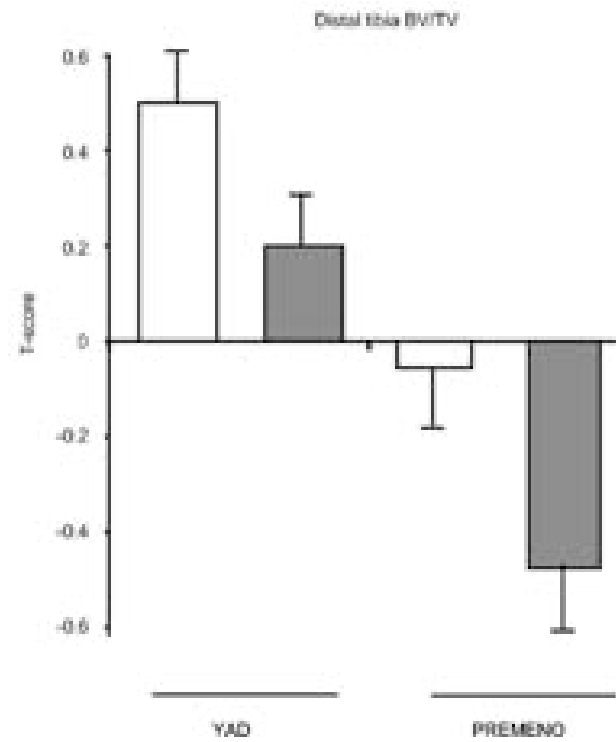
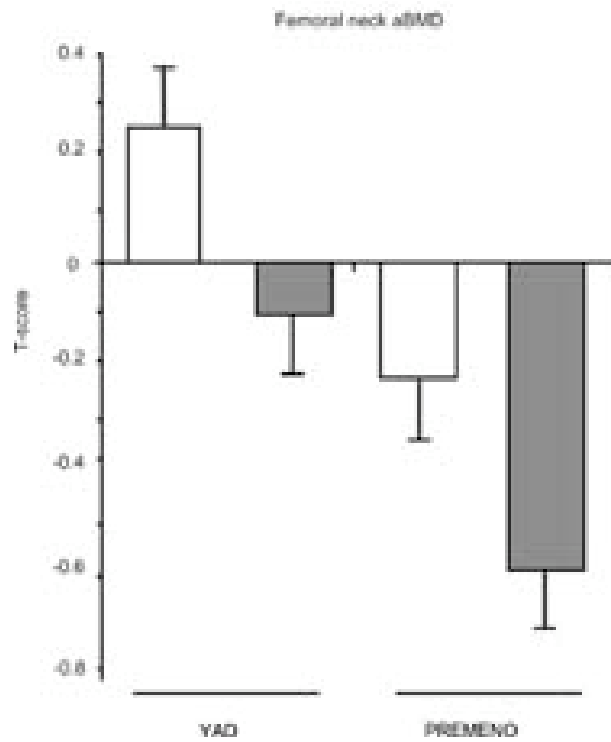
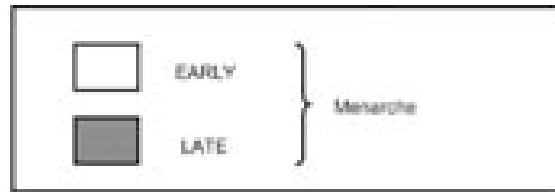
62-year-old woman
with vertebral fracture in T12

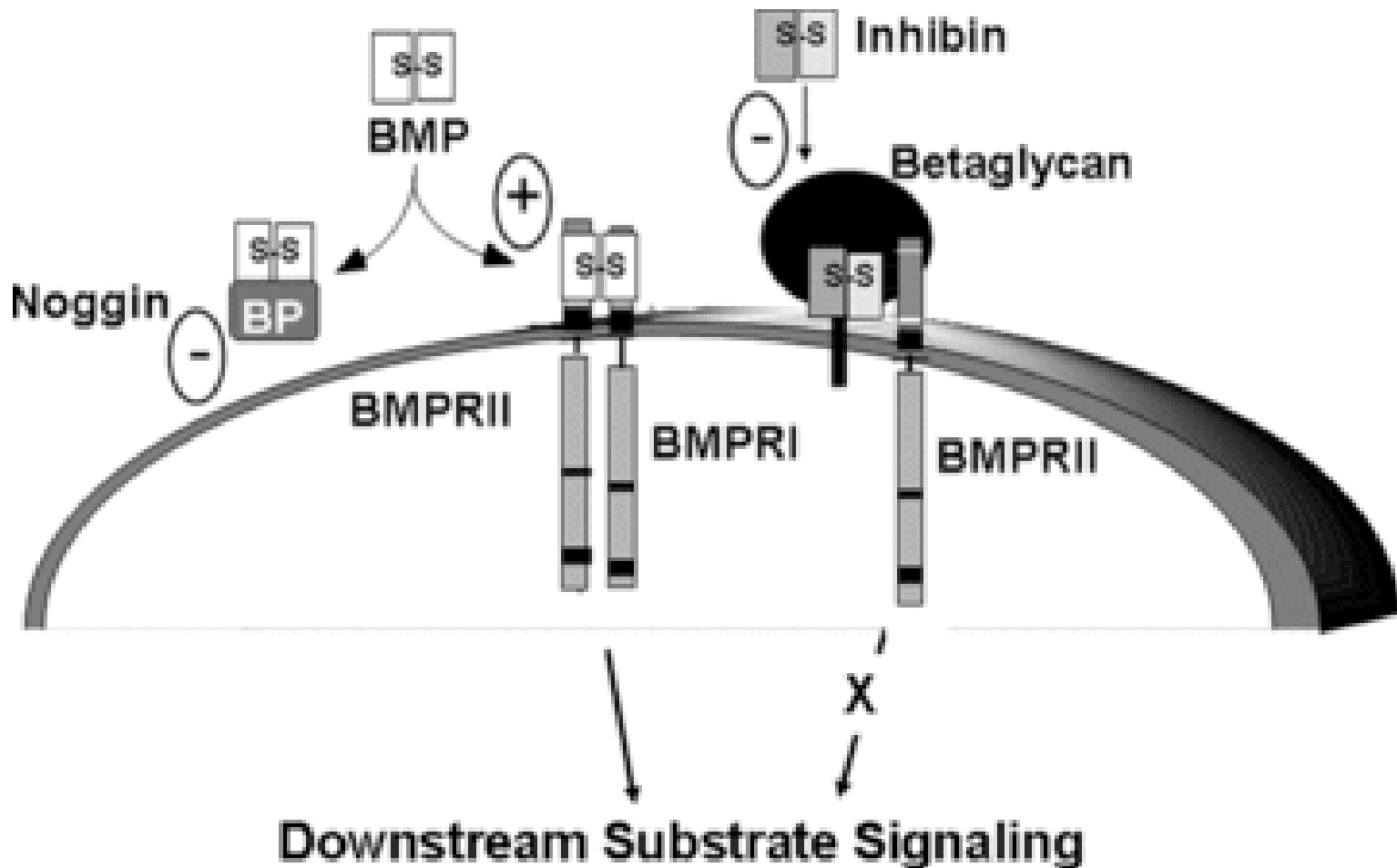


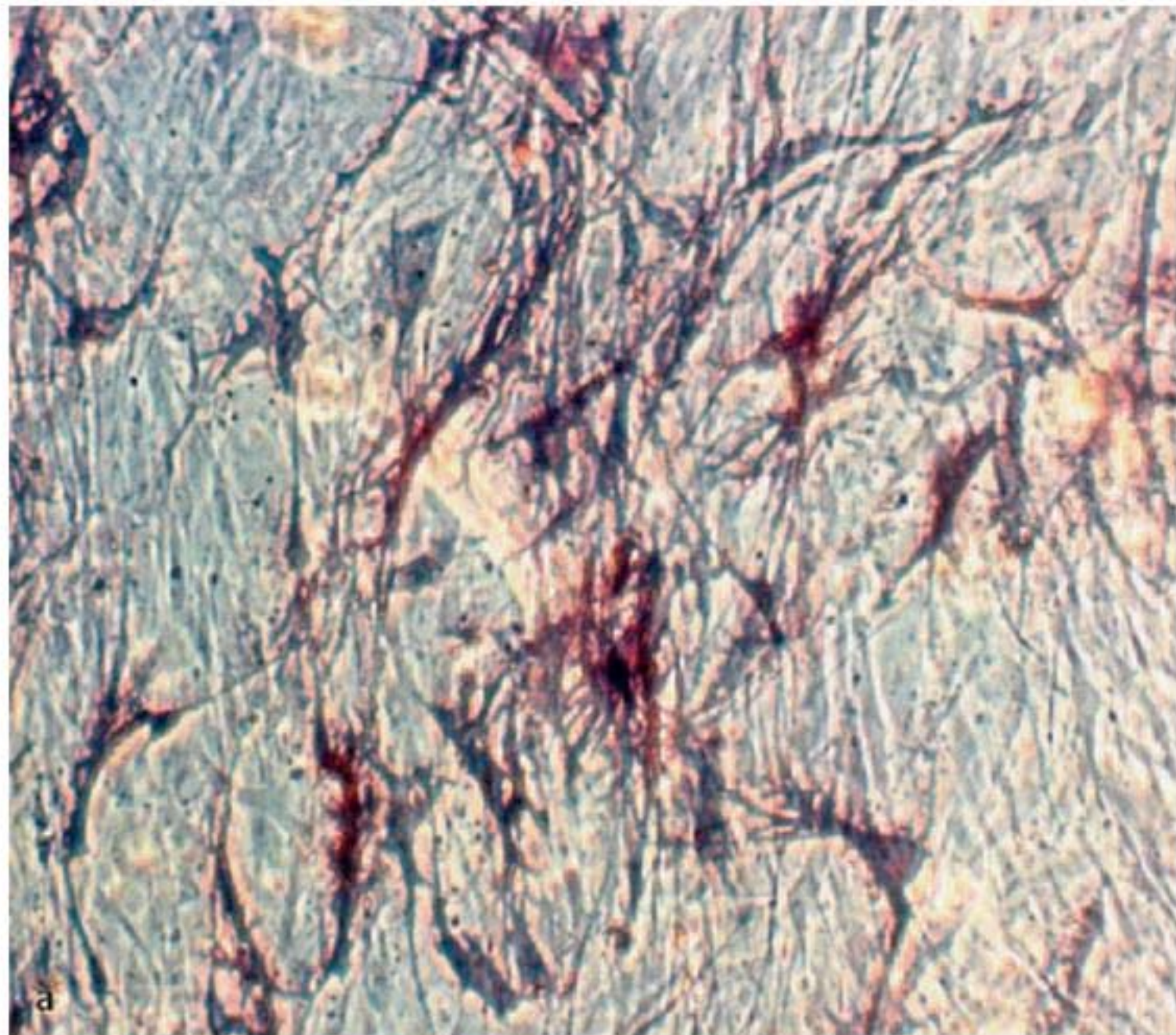


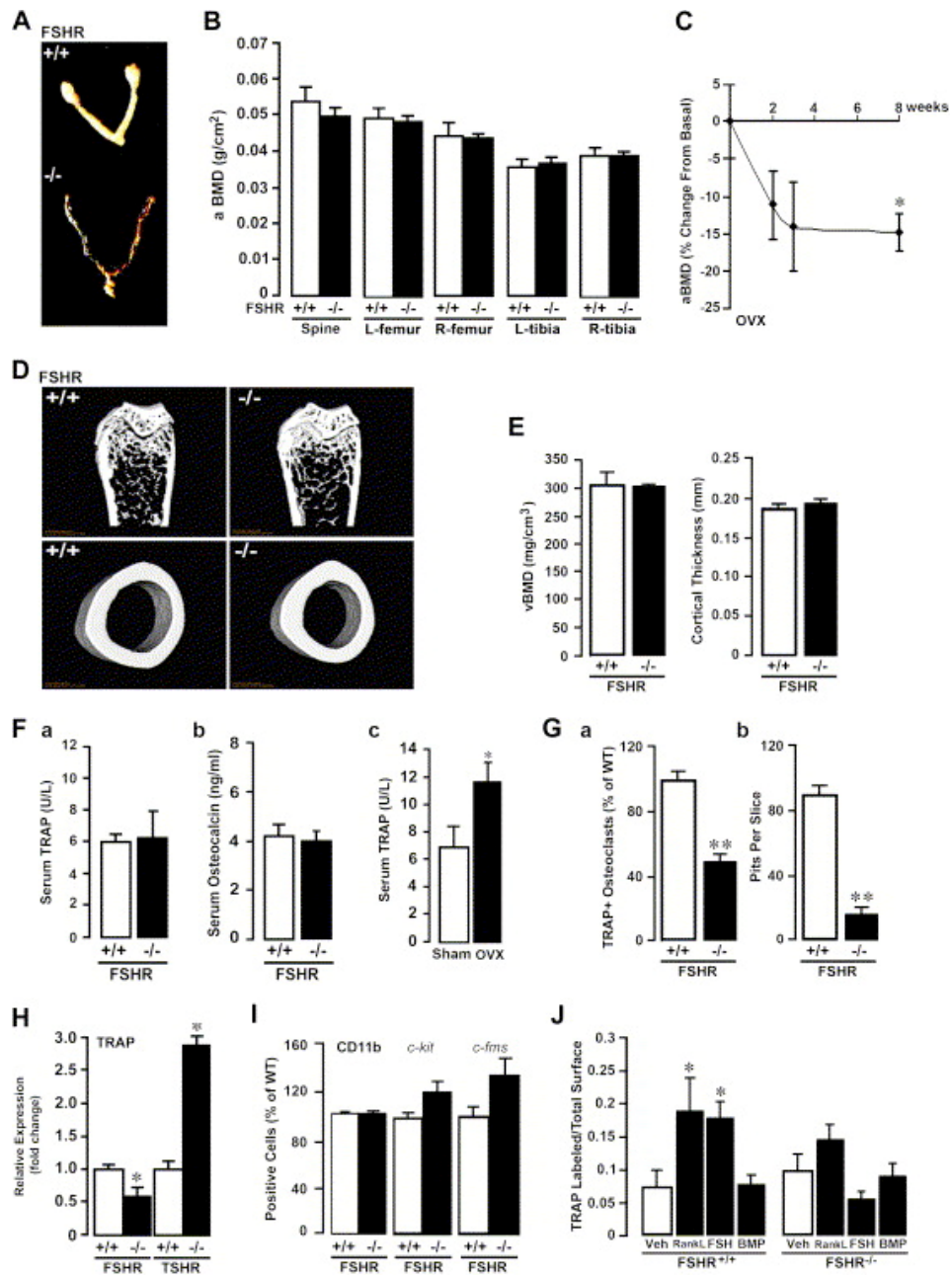


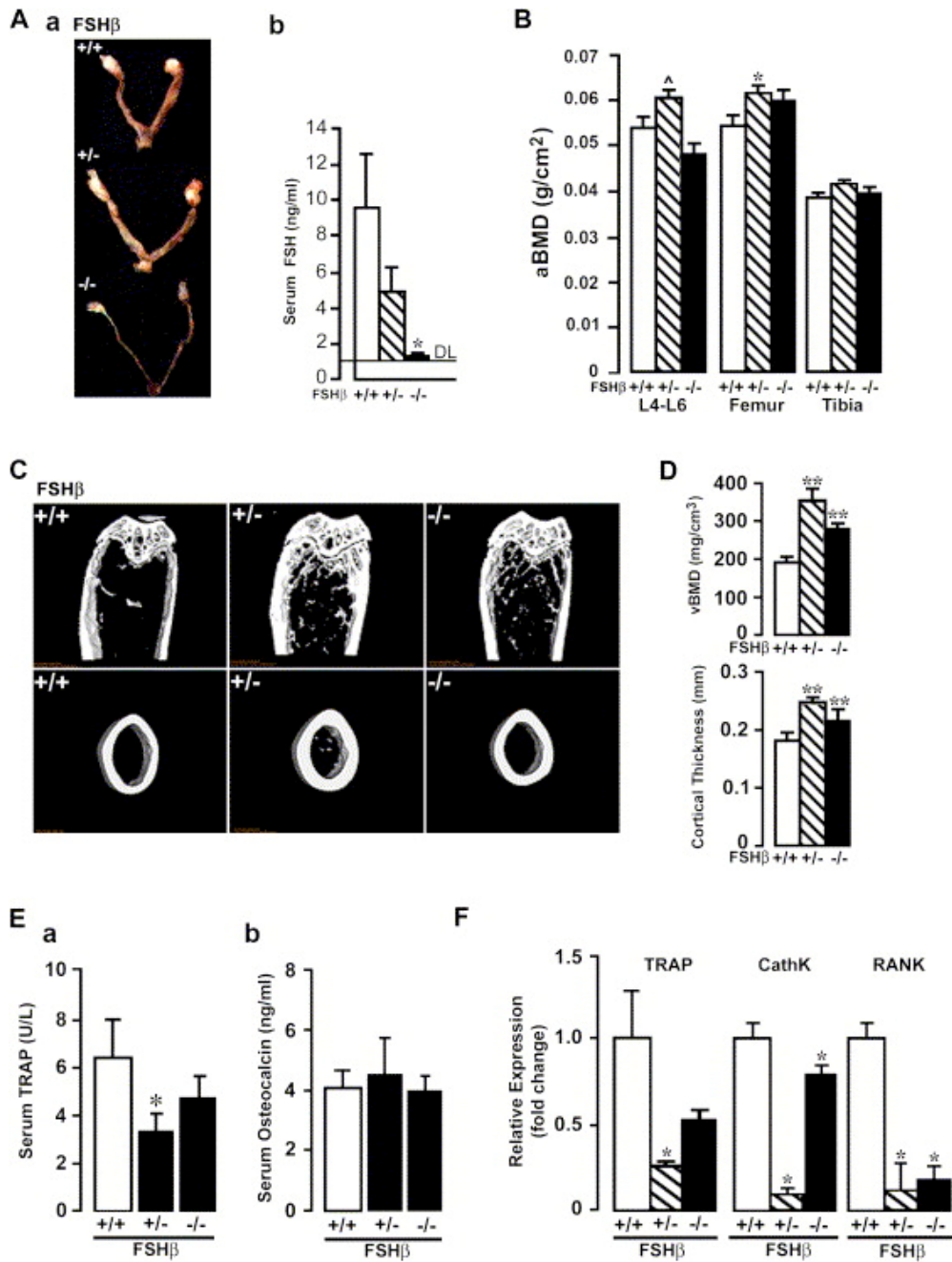


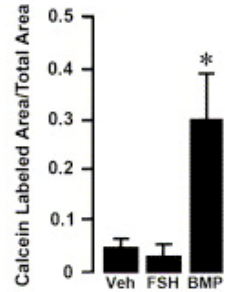




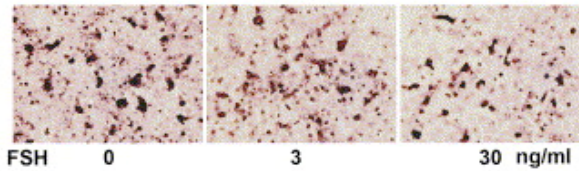
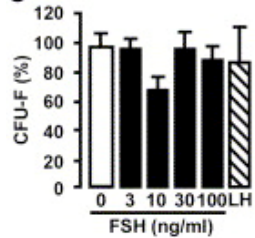




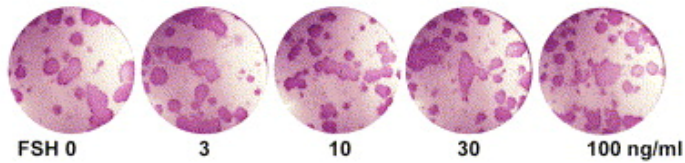
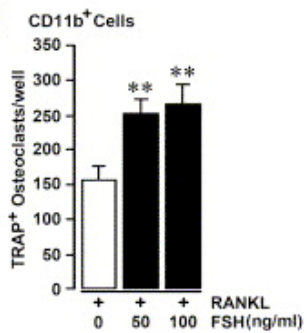
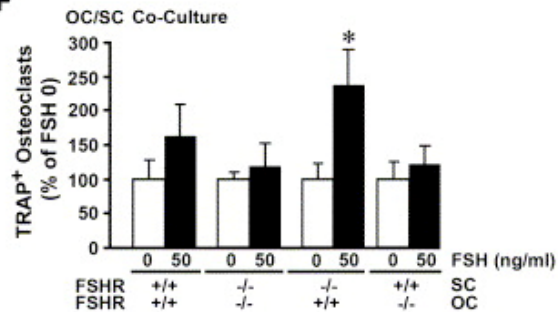
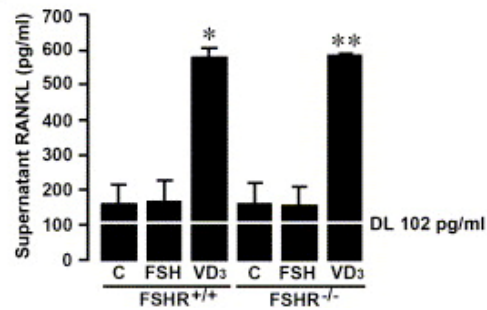


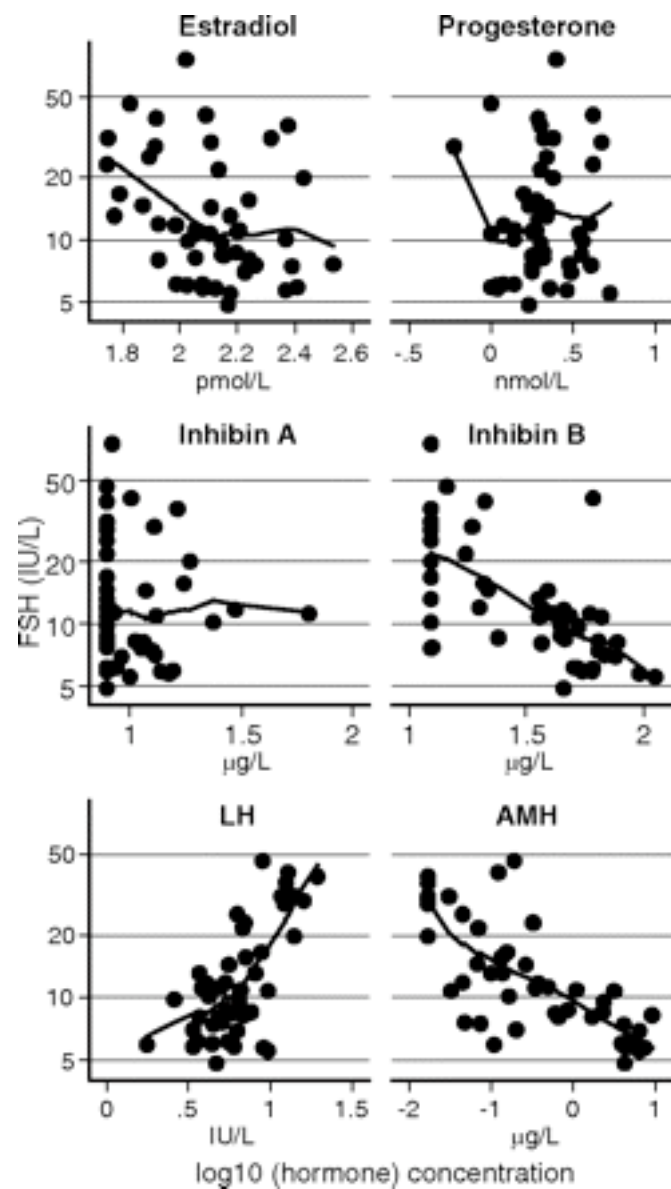
A Calvarial Cultures**B**

von Kossa-Positive Colonies (CFU-ob)

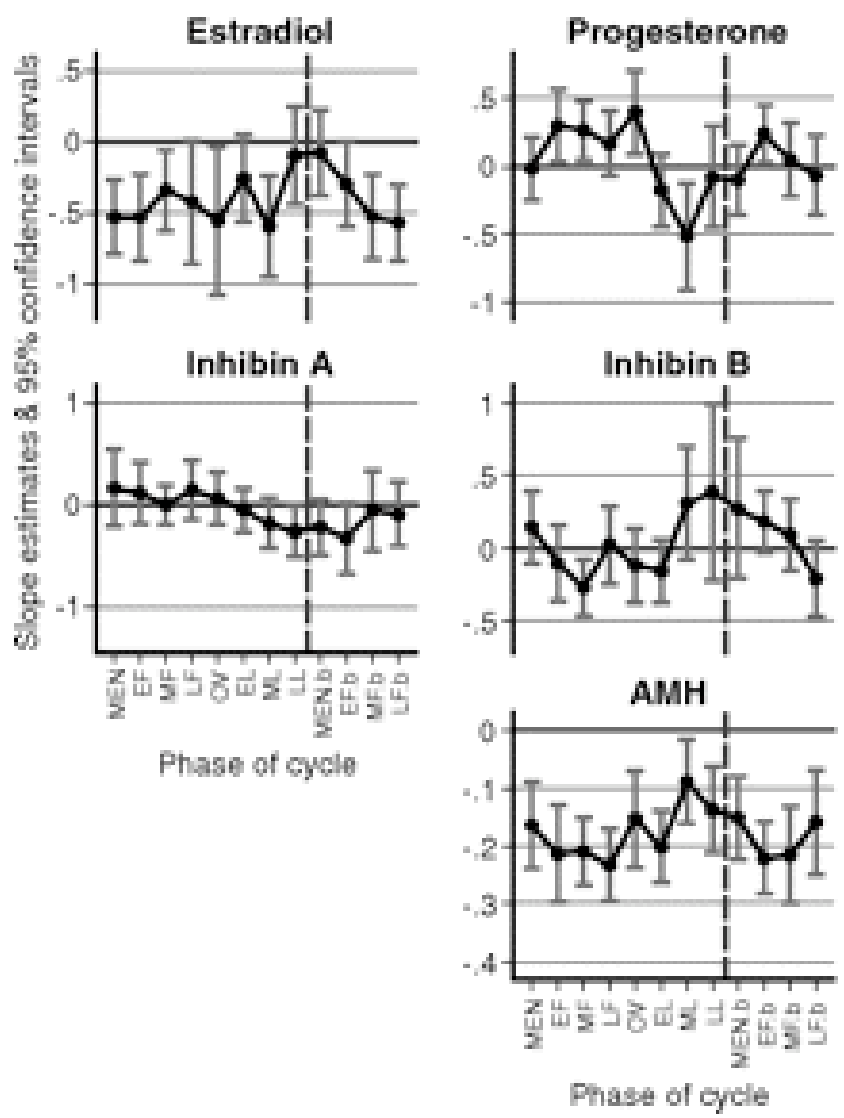
**C****D**

Alkaline Phosphatase-Positive Colonies (CFU-F)

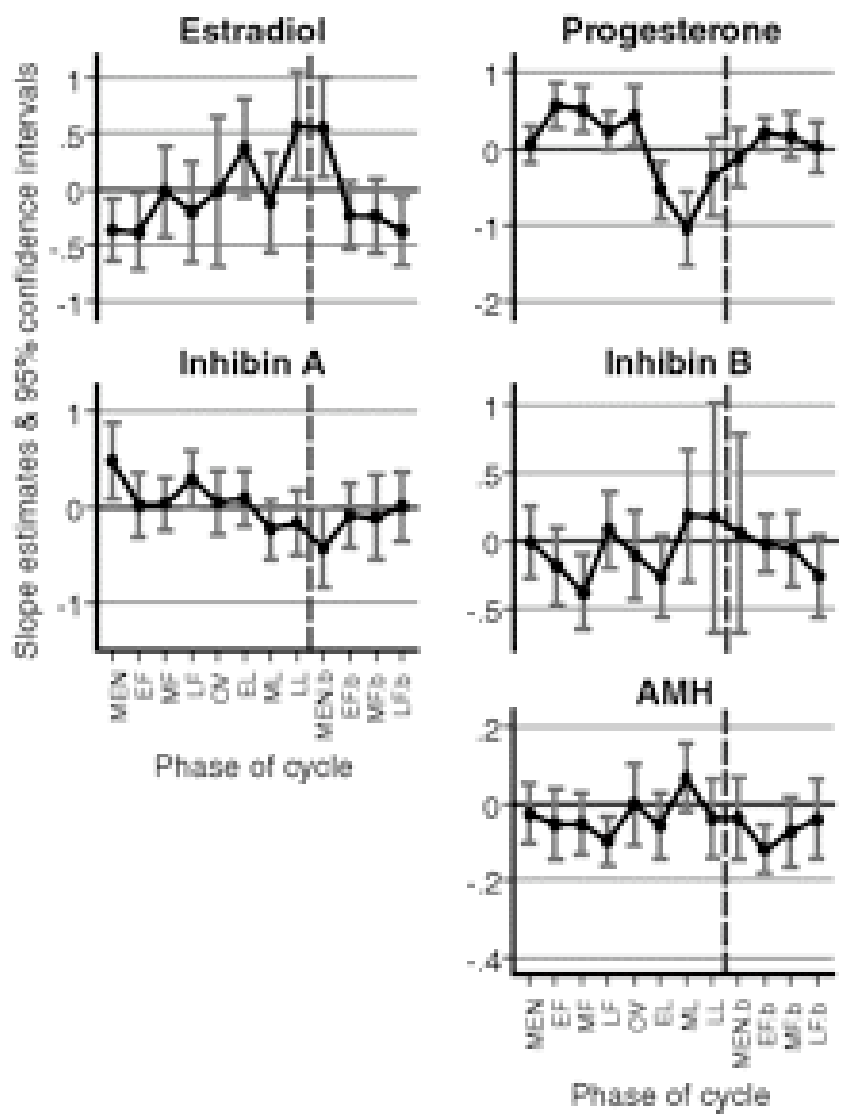
**E****F****G**

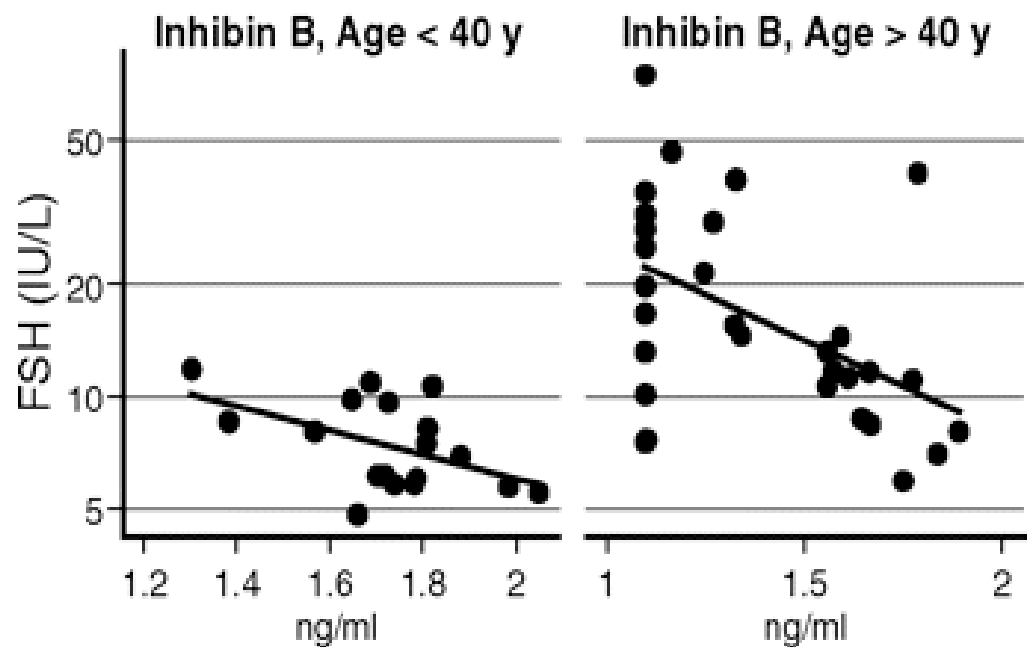
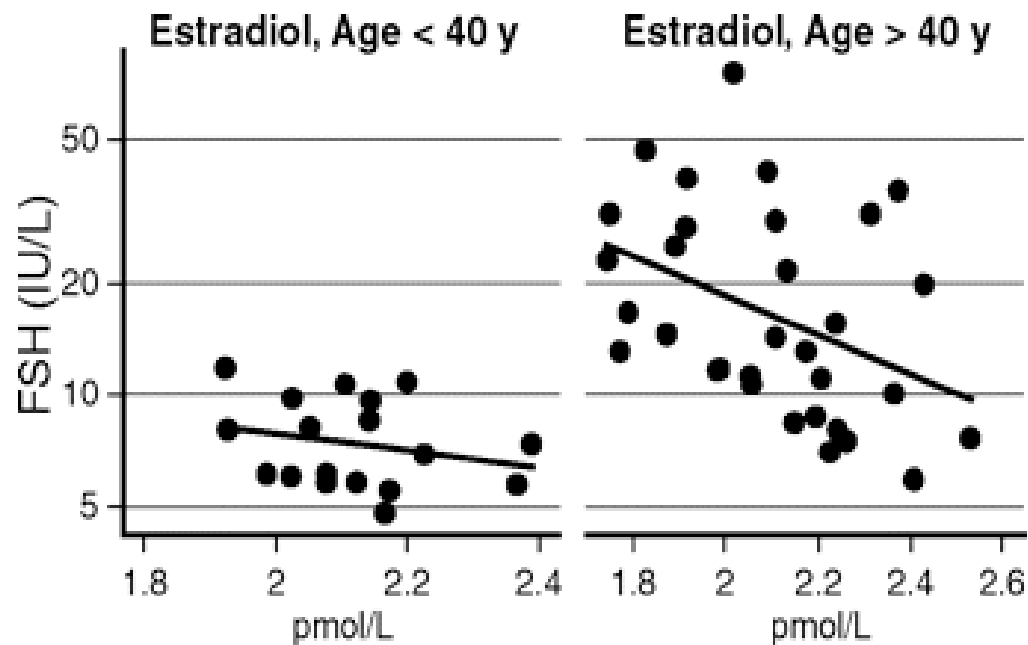


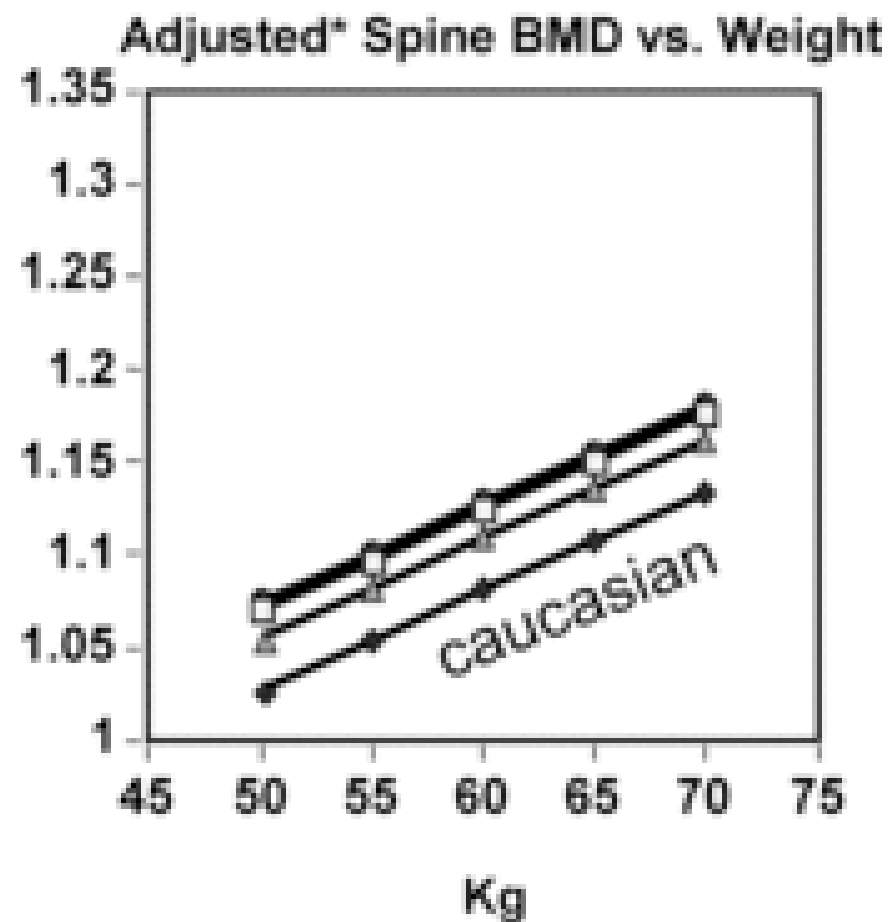
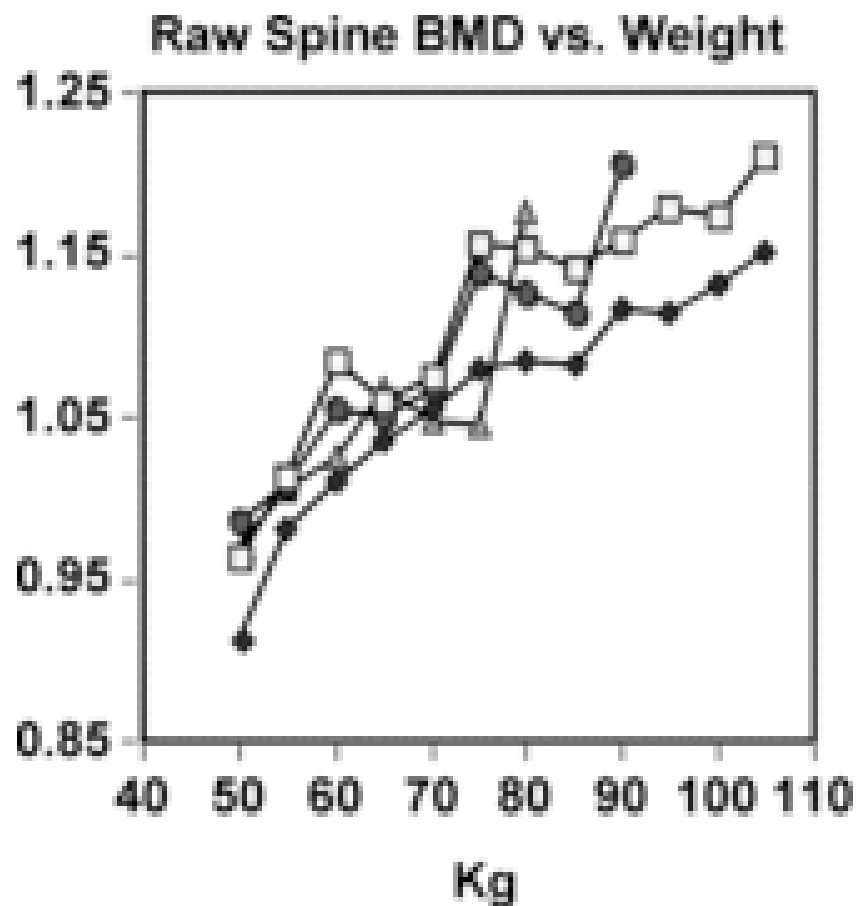
A Multivariable FSH (with LH simultaneously)



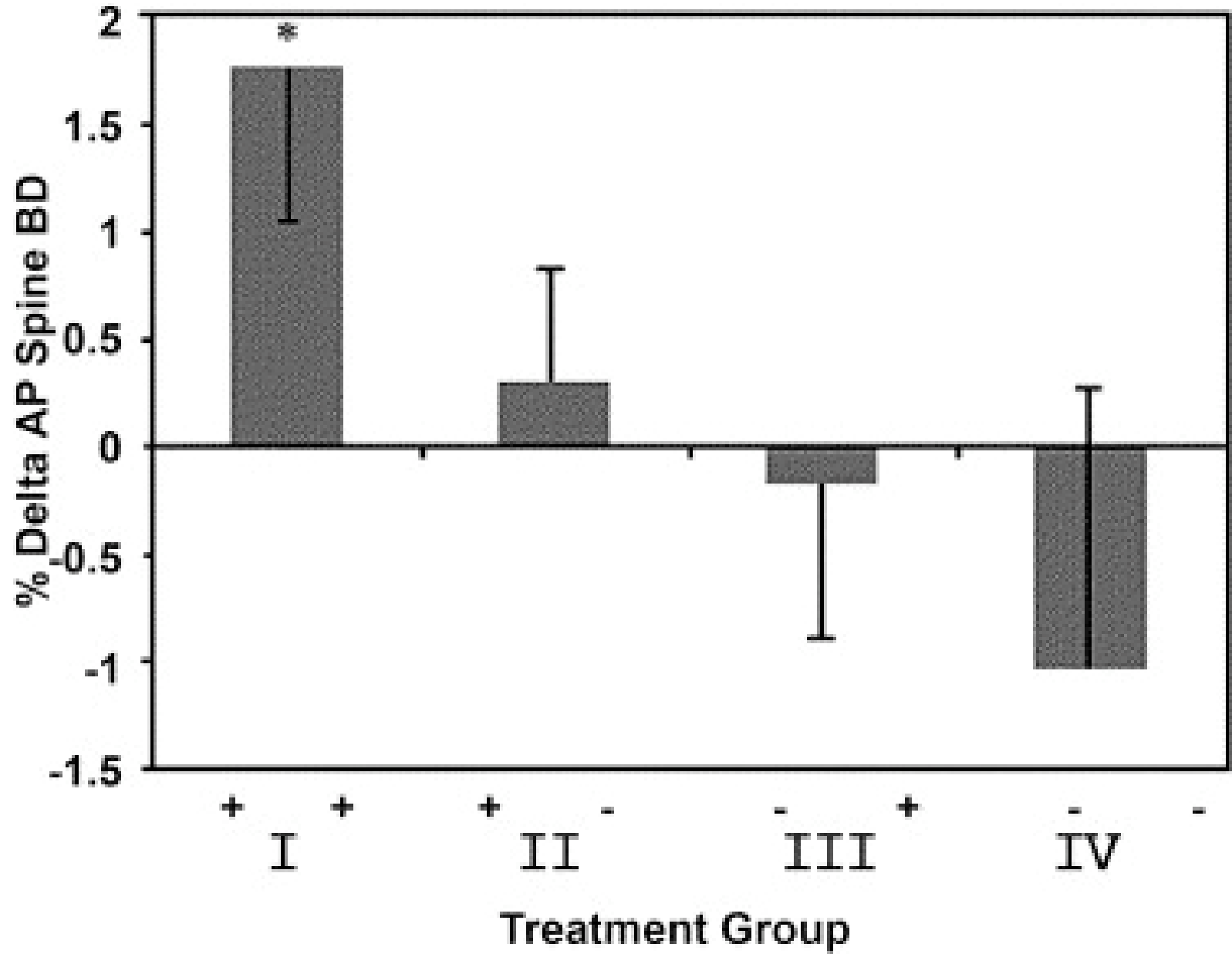
B Multivariable LH (with FSH simultaneously)



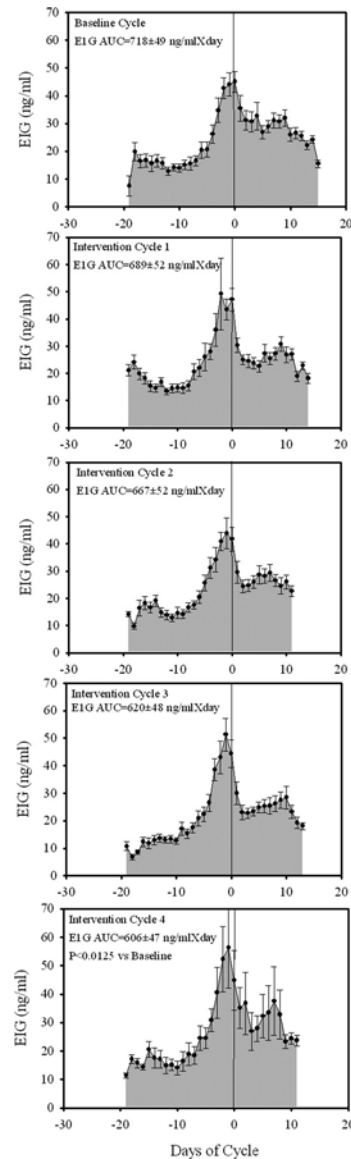




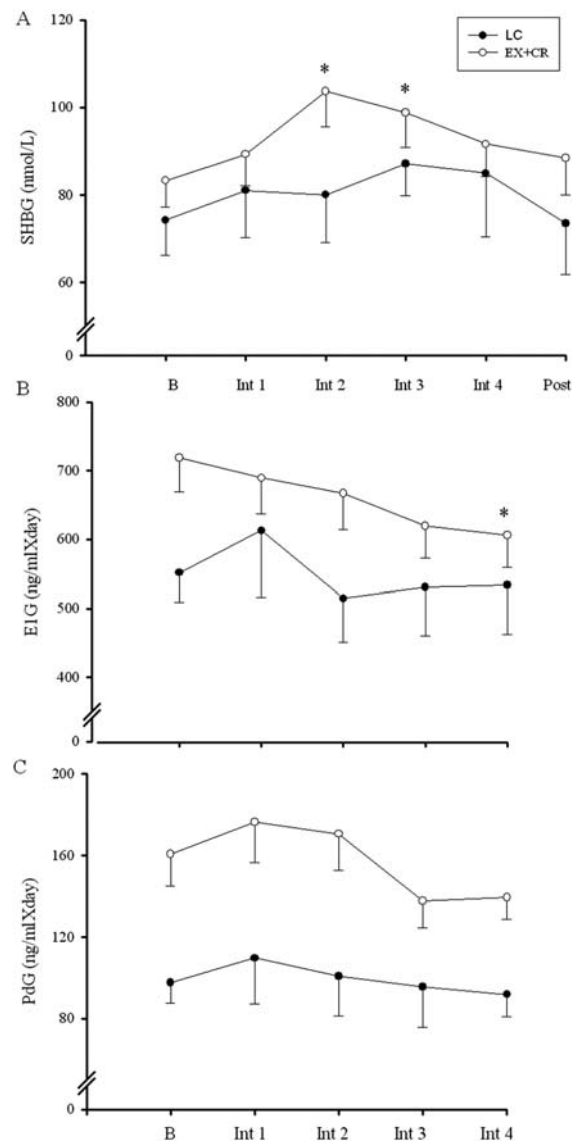
* Adjusted for menopause stage, menarche age, OCP use, activity, # pregnancies, education, diet Ca, tobacco and alcohol use, age



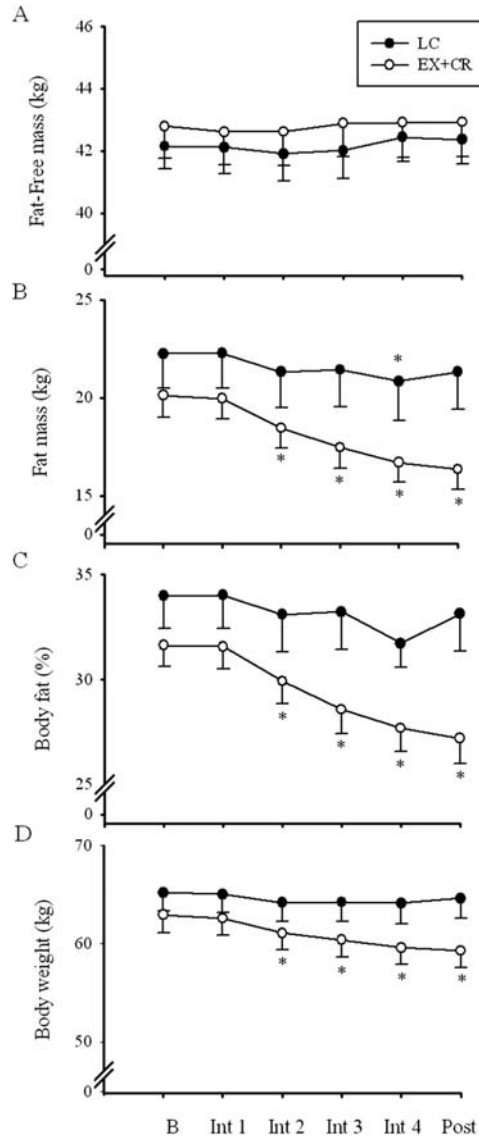
Composite graphs of the effects of exercise training and caloric restriction on the EIG AUC in all subjects in EX + CR during baseline and all intervention cycles.

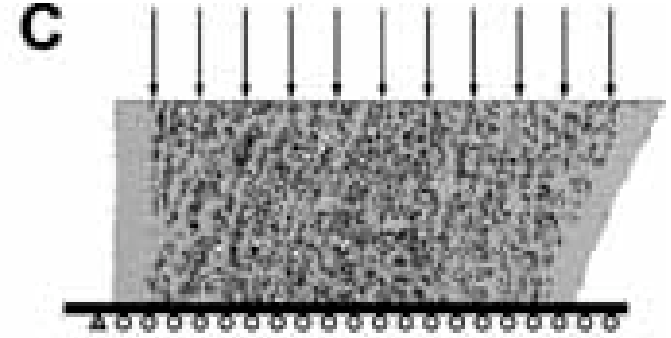


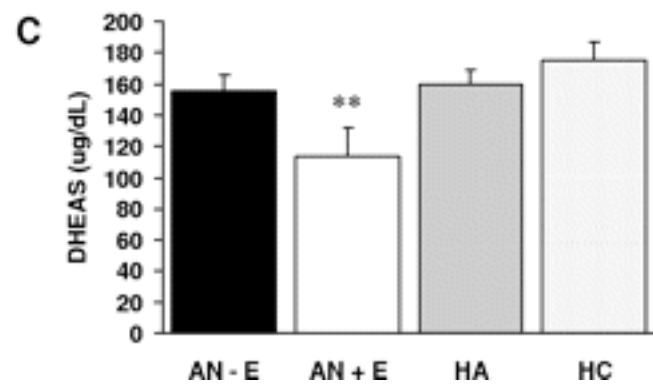
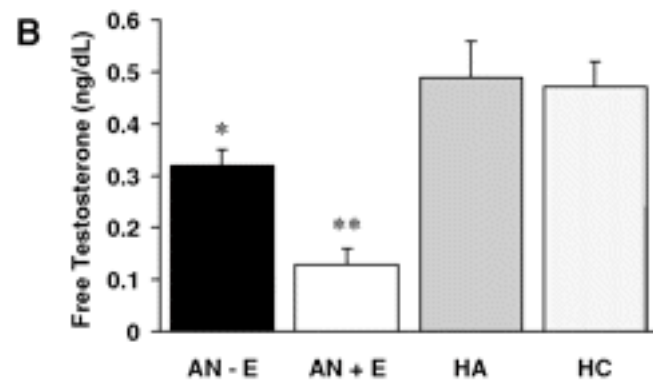
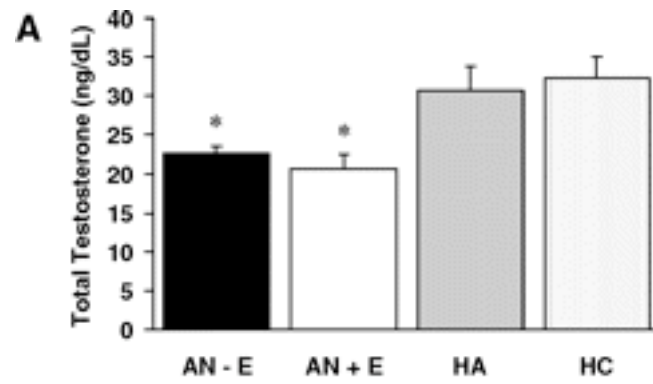
Effects of exercise training and caloric restriction (EX + CR: open circle) and light conditioning (LC: filled circle) on (A) SHBG, (B) mean E1G AUC and (C) mean PdG AUC for each cycle in all subjects across the intervention.

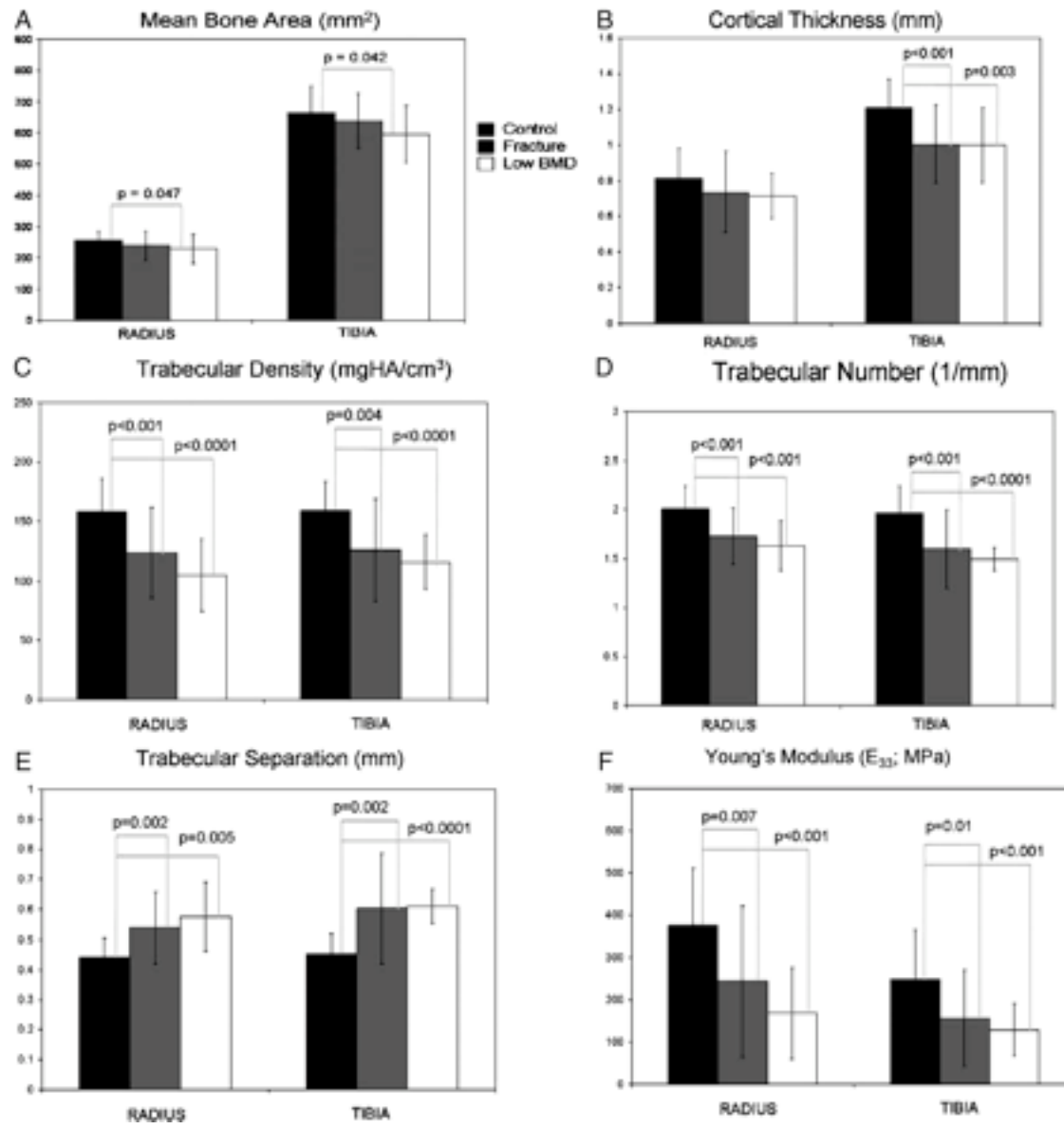


Effects of exercise training and caloric restriction (EX + CR: open circle) and light conditioning (LC: filled circle) on (A) fat-free mass, (B) fat mass, (C) body fat and (D) body weight in all subjects over time.

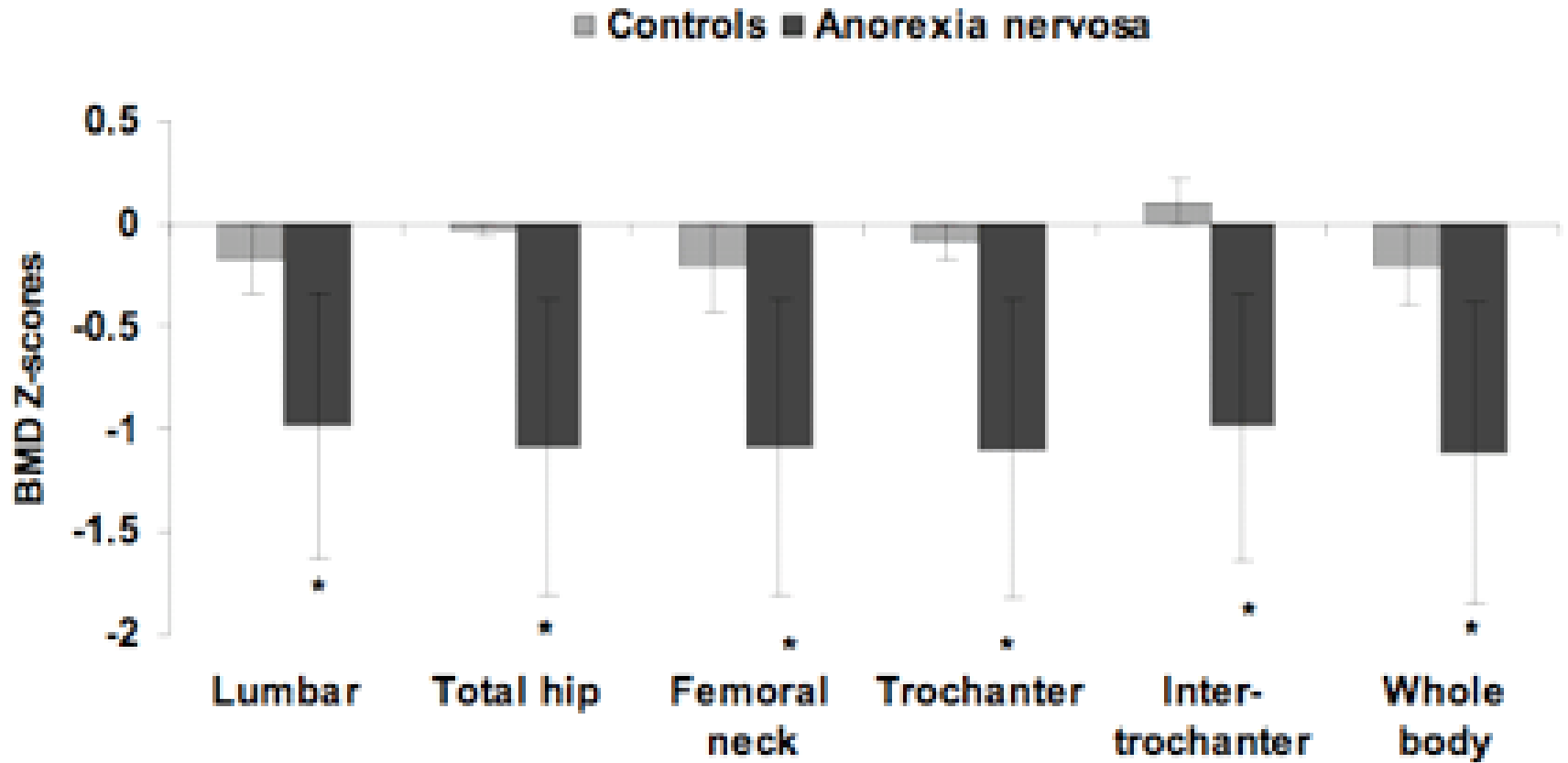




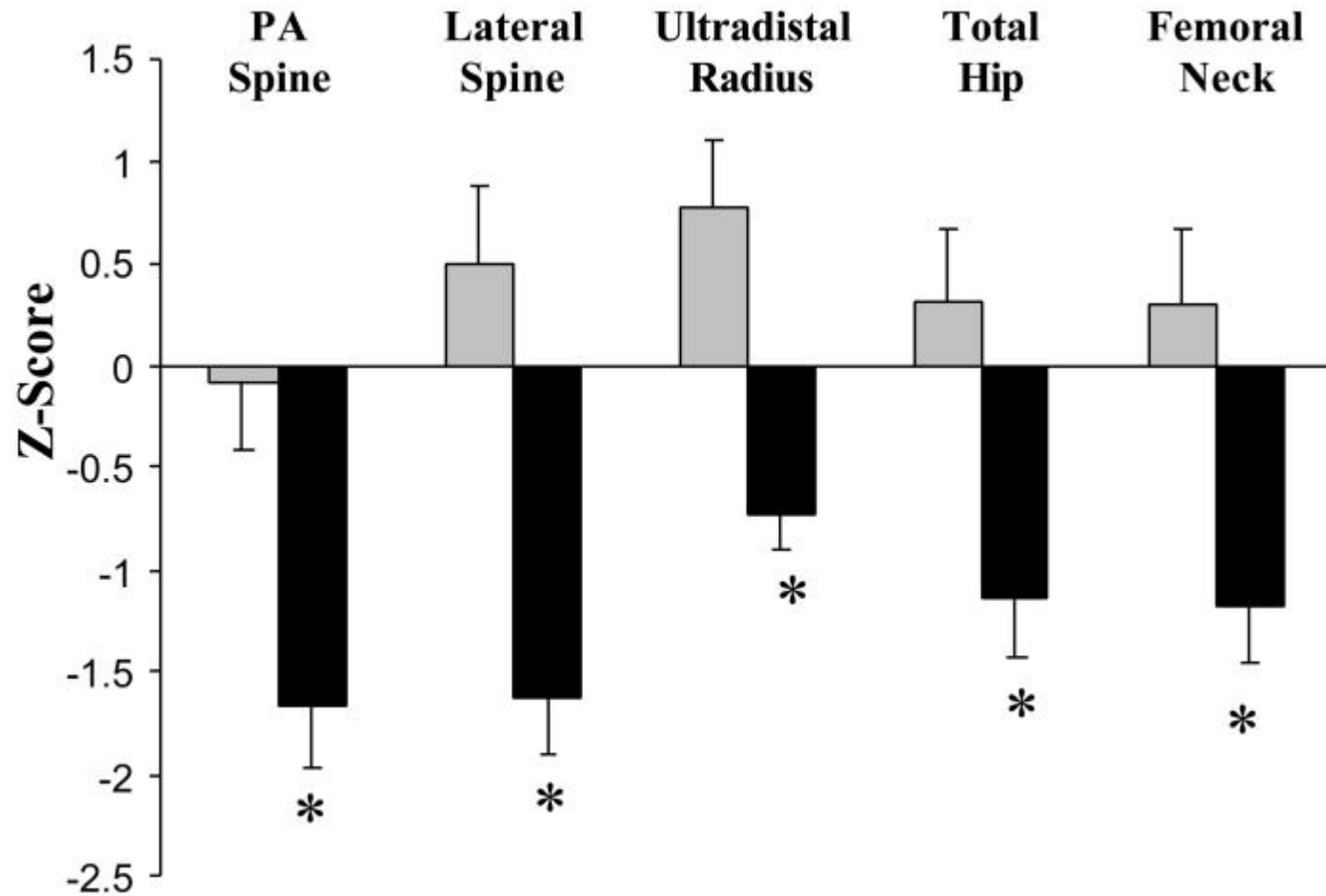




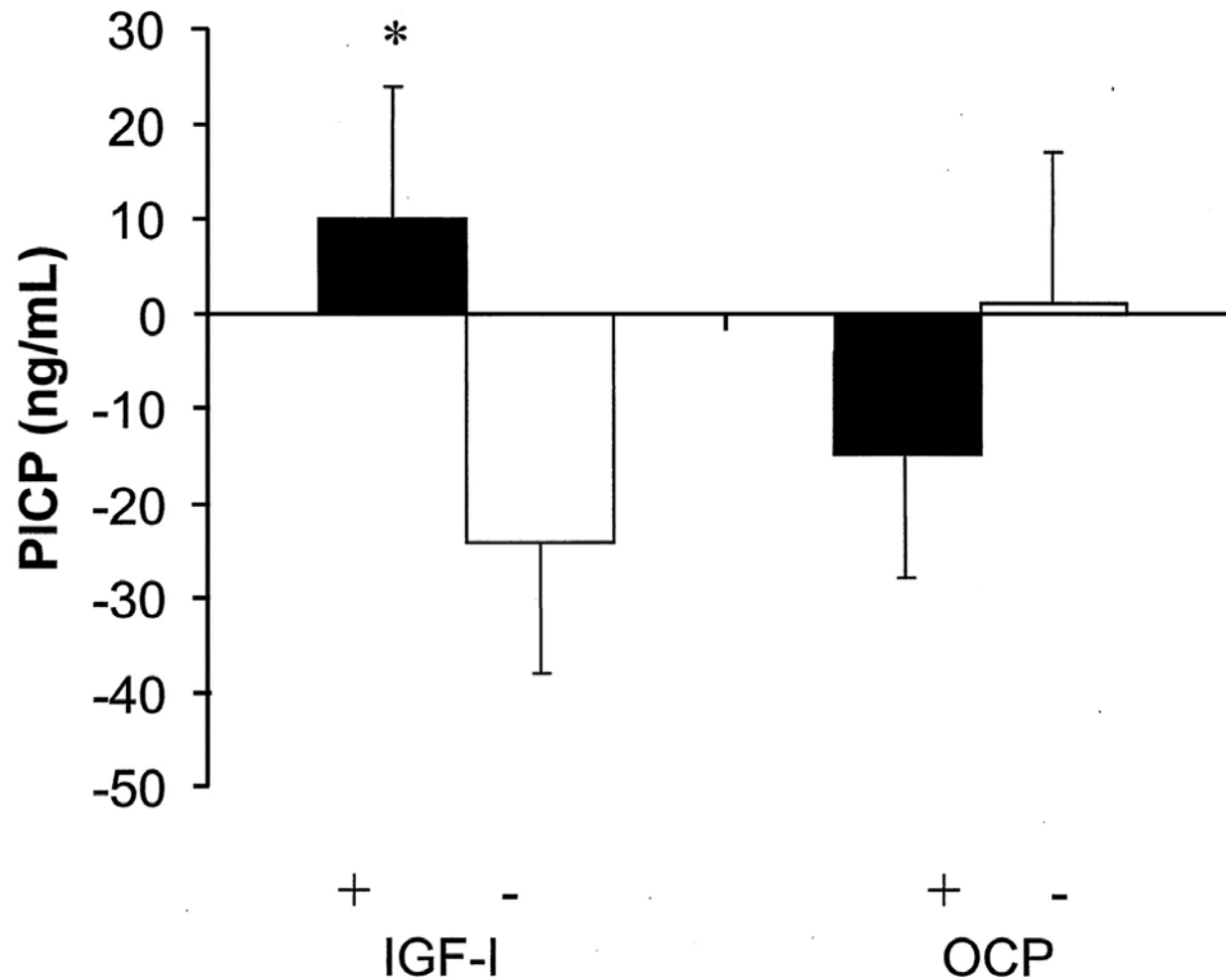
Masa ósea en pacientes con Anorexia Nerviosa



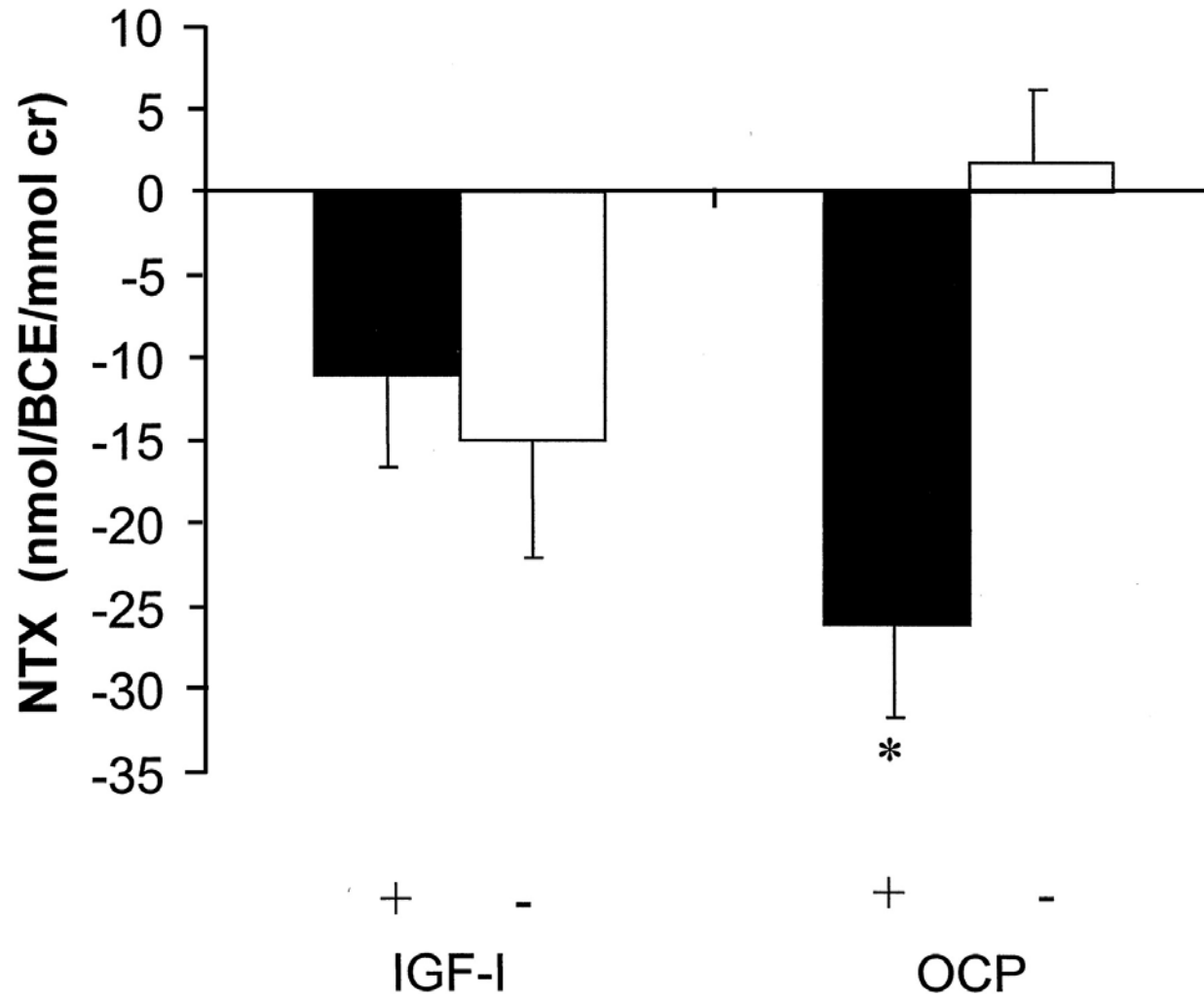
Masa ósea en pacientes con Anorexia Nerviosa



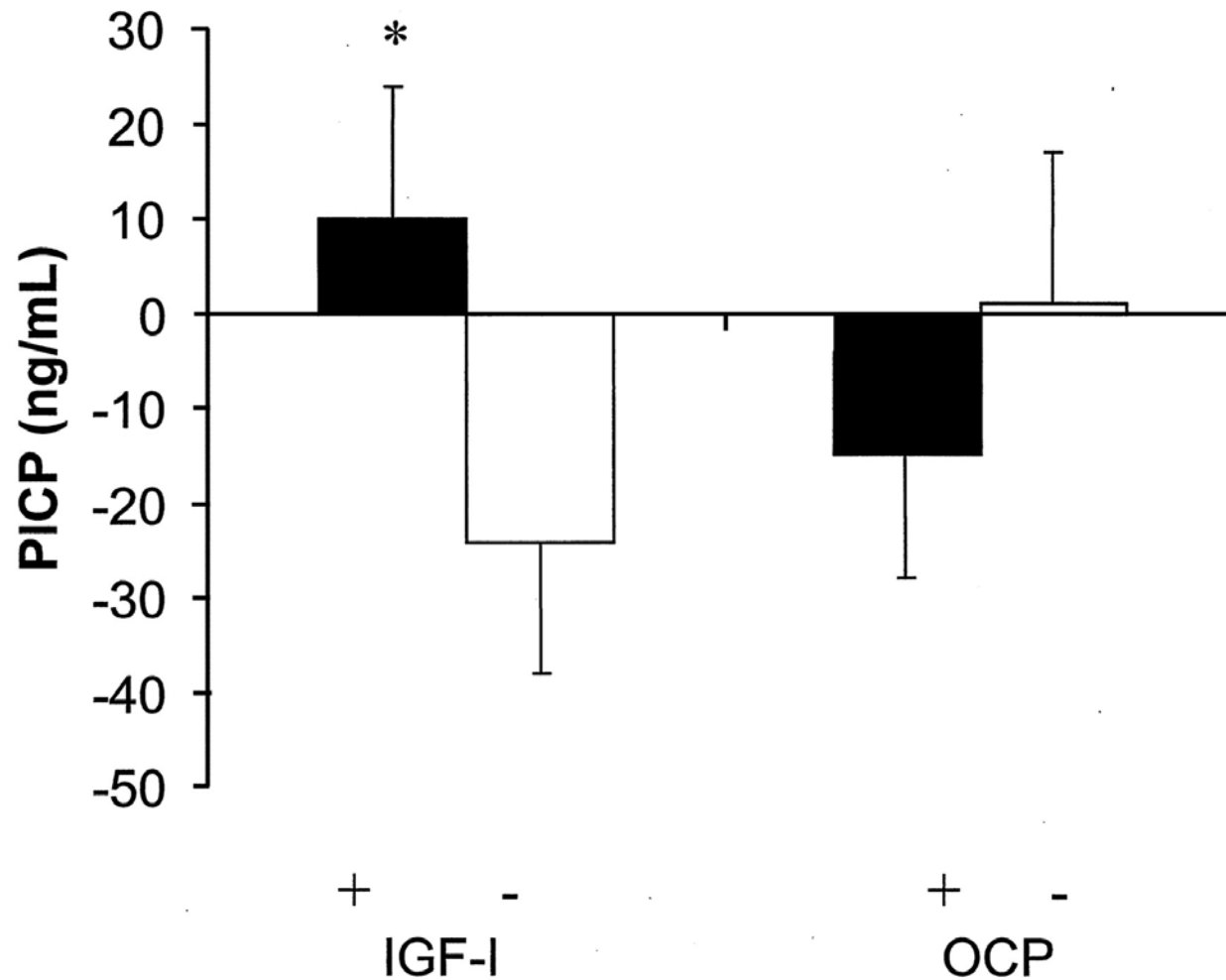
Remodelado óseo en A.N. Respuesta al tratamiento



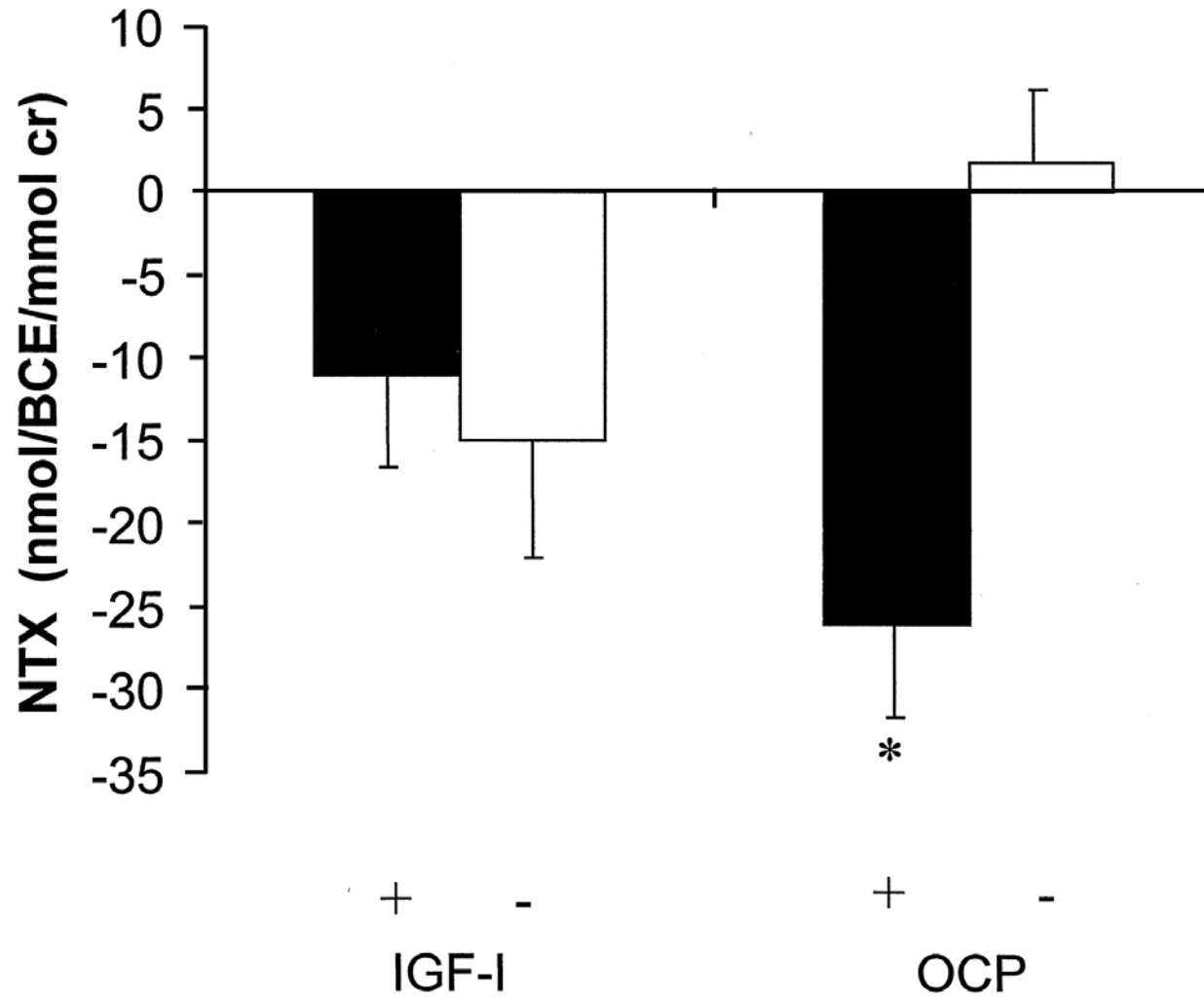
Remodelado óseo en A.N. Respuesta al tratamiento



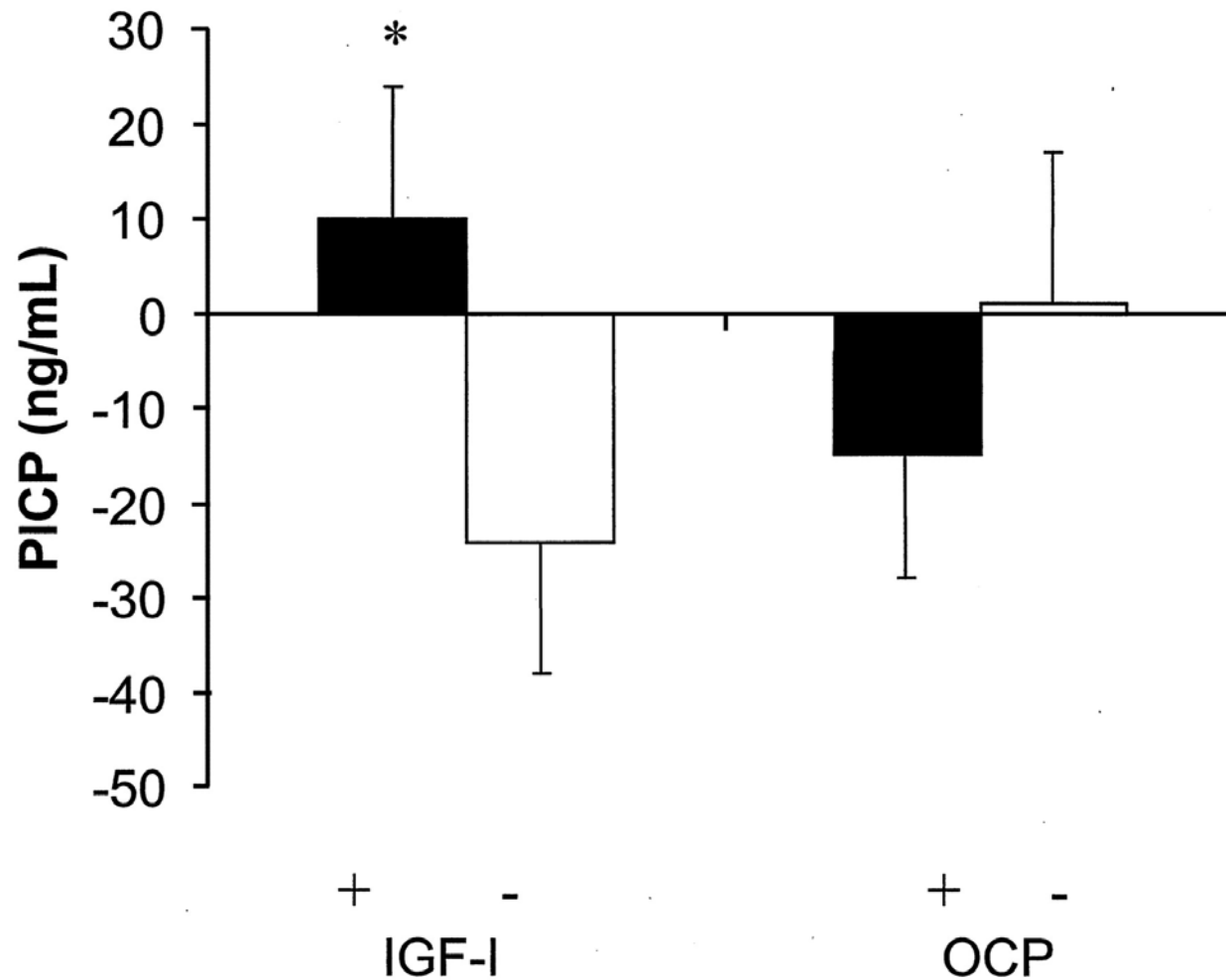
Remodelado óseo en A.N. Respuesta al tratamiento



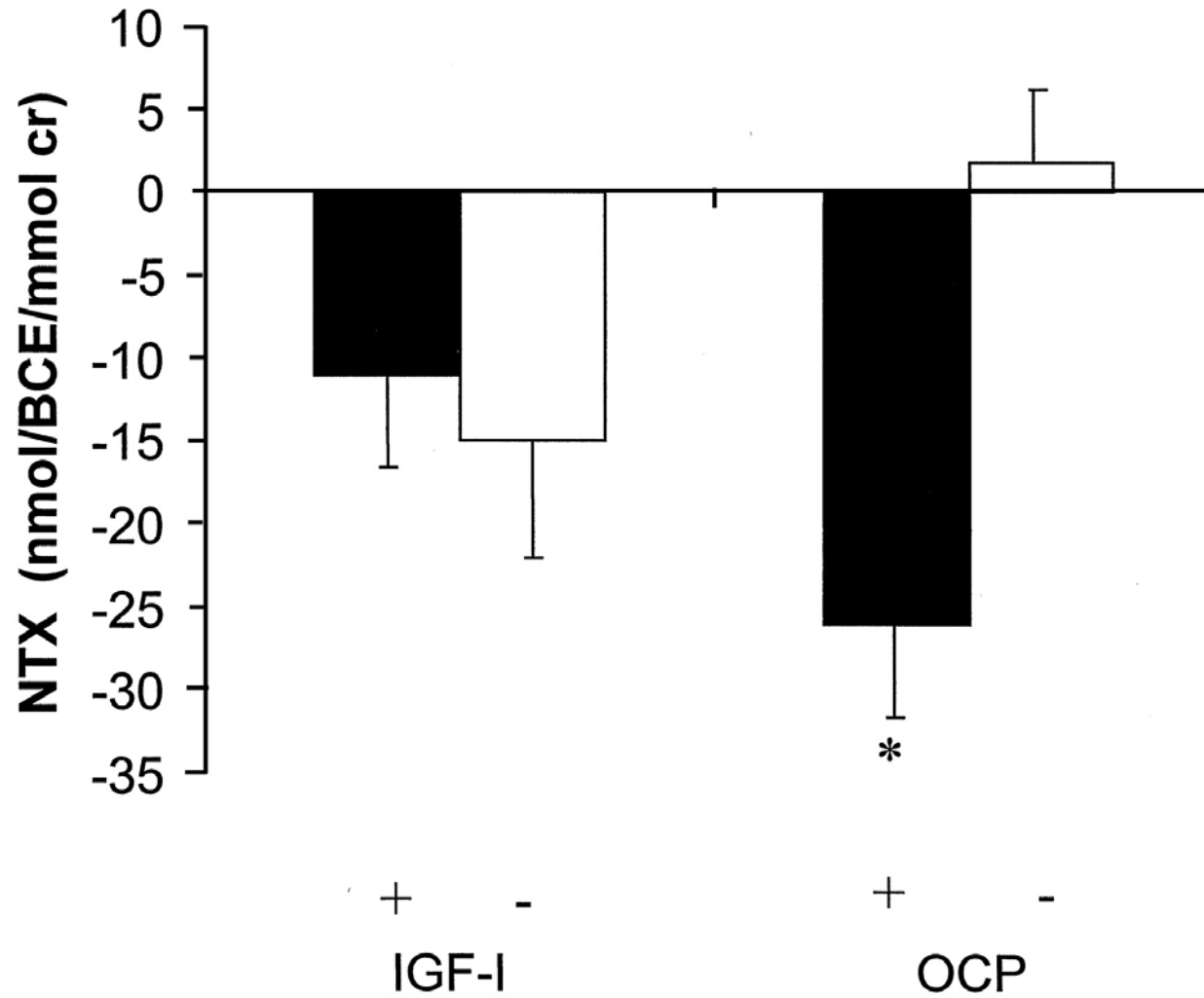
Remodelado óseo en A.N. Respuesta al tratamiento



Remodelado óseo en A.N. Respuesta al tratamiento

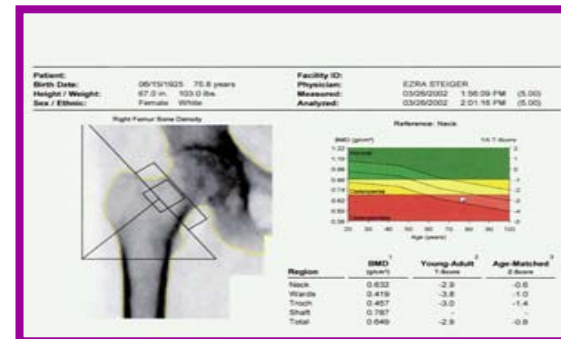


Remodelado óseo en A.N. Respuesta al tratamiento



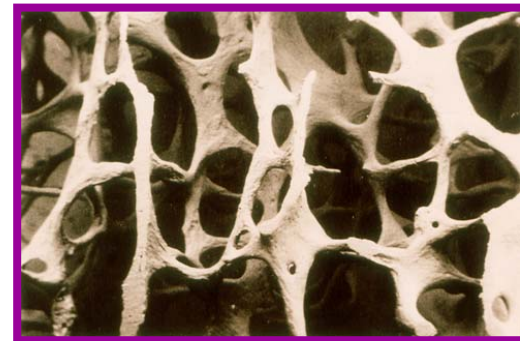
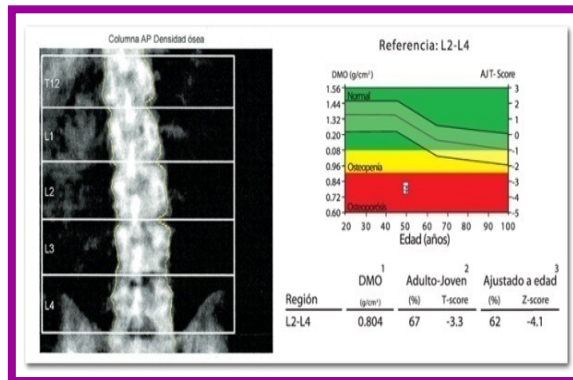
Análisis multivariable

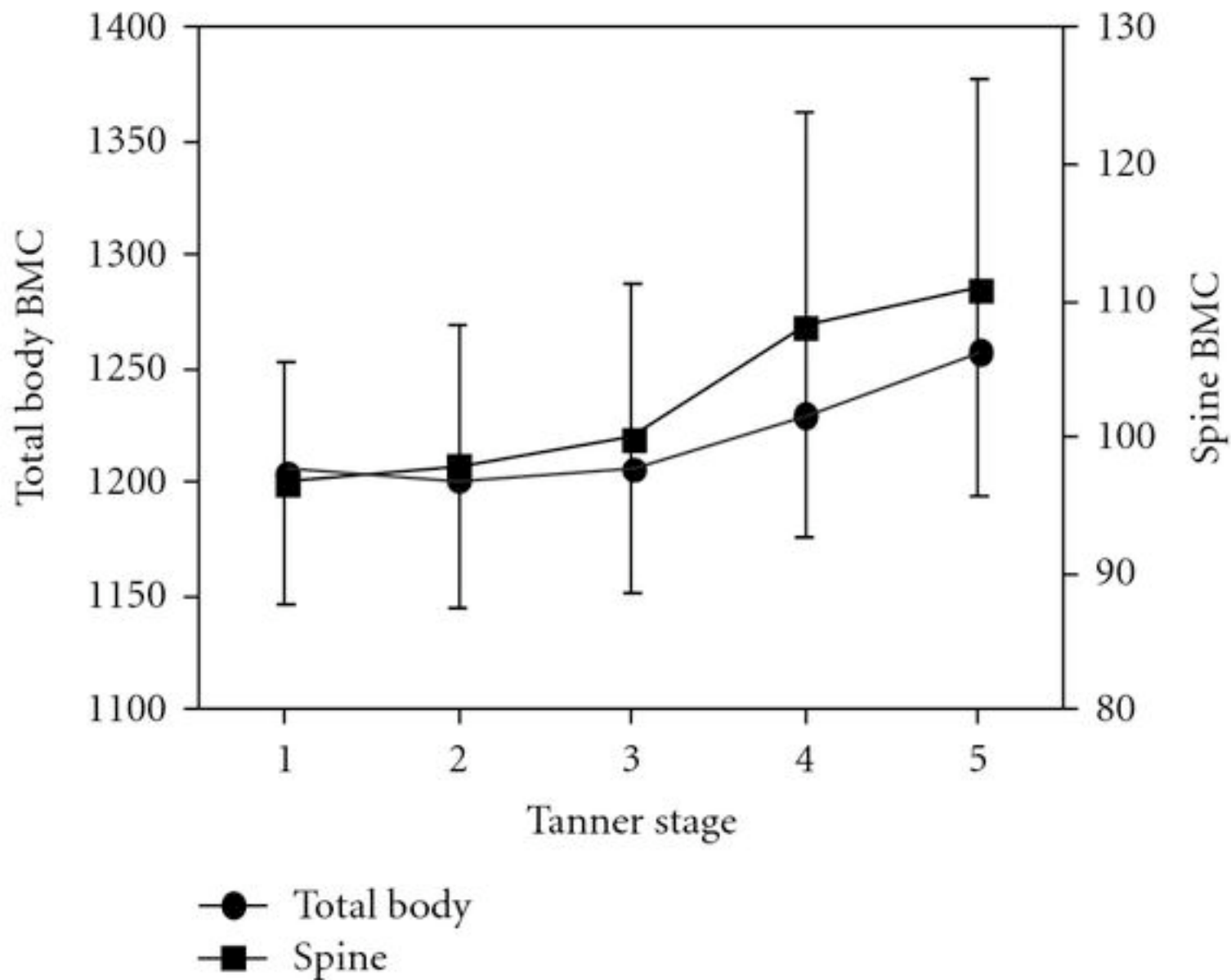
1°. Los valores de *DMO en cuello femoral* de las mujeres estudiadas, dependían en mayor medida de la existencia o no en sus madres de otra fractura por fragilidad añadida a la del EDR, que de los niveles de masa ósea materna.



Análisis multivariable

2°. A nivel de *columna lumbar*, fue la DMO materna la que ejerció una mayor influencia sobre los valores de masa ósea de las hijas de mujeres con fractura del EDR.

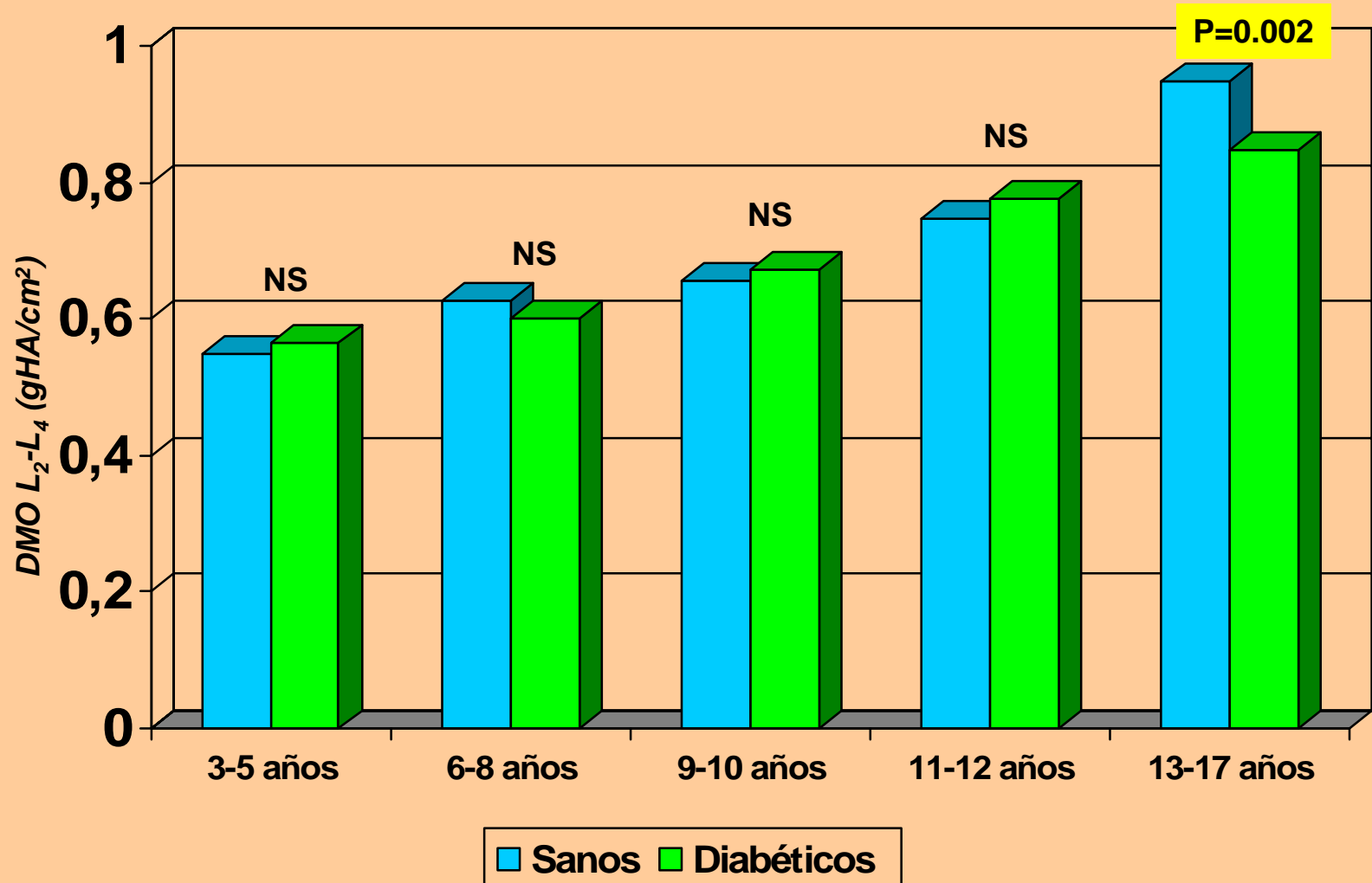




OP Premenopáusica Idiopática: características clínicas y alteraciones del remodelado óseo.

Resultados:

DIABETES TIPO 1 (NIÑOS)



DIABETES Y HUESO (Meta-análisis)

P. Vestergaard.: Osteoporosis Int. 2007;18:427-444

RR de Fx. encontrado y RR esperado según DMO

<u>Tipo DM</u>	<u>Tipo Fx.</u>	<u>RR esp.</u>	<u>RR encontr.</u>
Tipo 1	Cadera	1.42	6.95-8.65 <u>(x 5)</u>
Tipo 2	Cadera	0.77	1.38 <u>(x 1.8)</u>
	Toda Fx.	0.85	1.19 <u>(x 1.4)</u>

No existe relación entre DMO y HbA1C. Mayor riesgo de fractura y menor DMO en los pacientes con complicaciones de la diabetes