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Study of Osteoporotic Fractures (SOF)

Study Collection Forms

Visit 7

Morphometry: Vertebral Fractures General

Form Type: Documentation

LEGEND:

Raw form variable names are located next to the question they represent and do not have a border around the variable name.

Calculated variable names are derived from other variables and have a border around the variable name. The calculated variables names are located in close proximity to the questions from which they were derived.

Some of the questions and measurements on these forms are not being released, and therefore no variable name is provided for them.

Vertebral Morphometry Documentation

Digitization

Spine x-rays were performed on all SOF participants in the main cohort at the baseline (V1) visit, and in the AA cohort at their second visit (V7). The x-rays were first triaged for any vertebral deformity. X-rays with any possible or uncertain vertebral deformity were digitized. The x-rays were digitized using a CalComp digitizing board at UCSF. Six points were placed on each vertebral body to define 3 vertebral heights: Ha (anterior height), Hm (mid height), and Hp (posterior height). In the main cohort L4-T4, and in the AA cohort L5-T4 were digitized.



Prevalent Fractures

The following 4 ratios are calculated: 1) H_a/H_p , 2) H_m/H_p , 3) H_p/H_p (above and below), 4) H_a/H_a (above and below). “Normal” means and standard deviations (SD) for height ratios were estimated using methods in Black (1991). These normals represent ratios expected in women with no vertebral deformities. Prevalent fractures were defined as any ratio 3 SD’s below the normal mean or $(\text{ratio}-\text{mean})/\text{SD} \leq -3$ (Black, 1995). A vertebra is considered fractured if any of the 4 ratios are 3 SD’s below the mean. Participants with x-rays that were triaged to not be digitized were considered to be unfractured.

Incident Fractures

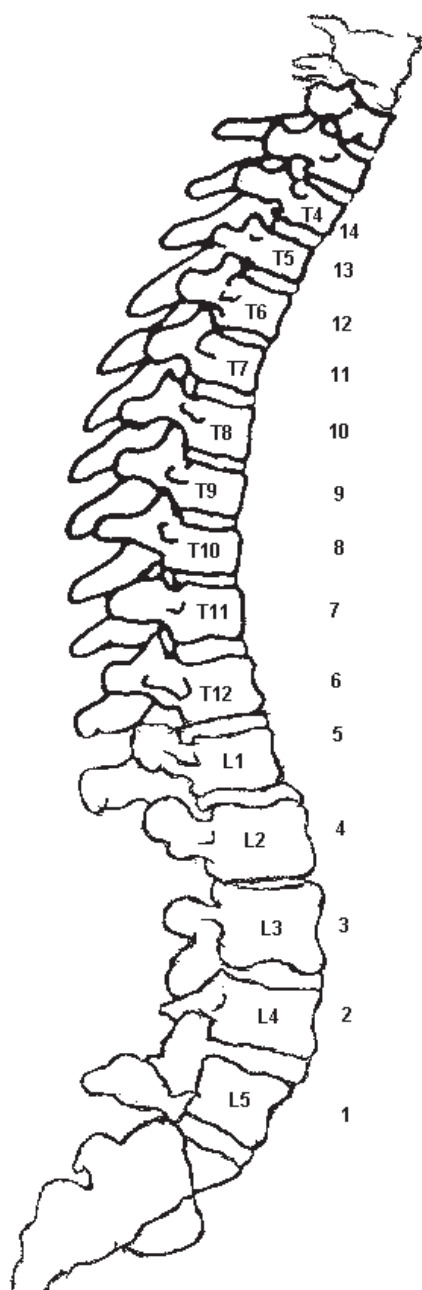
Follow-up x-rays were performed for the main cohort at V3 and V8, and for the AA cohort at V8. A vertebra is considered to have an incident fracture if any of the 3 heights decreased by 20% and at least 4mm from initial to follow-up x-ray (Black, 1999).

Vertebral Morphometry Documentation

Variables

Variables in the data include an overall indicator variable (0=no fracture, 1=fracture), an overall count of number fractured vertebrae, and vertebra-specific indicators for both prevalent and incident fractures, and time between x-rays for incident fractures. Variables for prevalent fracture have 'PFX' in the name, and for incident fracture have 'IFX' in the name. An 'N' precedes 'PFX' or 'IFX' for number of fractured vertebrae. Vertebra-specific indicator variables end in a number representing vertebral level (1-14).

Variables for incident fracture are named for the initial visit, e.g. first 2 characters of the variable name are for initial visit (V1, V3, V7). The 3rd character is the number of the follow-up visit (3, 8). For example, V13IFX is the overall incident vertebral fracture indicator between V1-V3, V13IFX5 is incident fracture indicator for L1, and V13NIFX is number of vertebrae with incident fracture from V1-V3.



Vertebral Morphometry Documentation

Missing values

.A= missing

.U= unable to do morphometry

.M=not applicable for vertebra-specific variables where triage=normal and morphometry not done

Notes

SOF main cohort, baseline

Of the 9704 participants, only 9575 were analyzed. 129 x-rays were not analyzed for the following reasons:

Missing x-rays, or mismatches, etc.	27
Point placement not possible due to x-ray quality, anatomy or both	102

SOF main cohort, V3

7238 x-ray pairs (V1-V3) were analyzed. 61 (of 102 above) were not analyzed.

SOF main cohort V8

2789 with clinic visit + 499 with home visits + 1 questionnaire only:

2729 with x-rays, 2696 with complete morphometry, 33 rejected for quality/anatomy reasons.

34 refused

105 participant unable to have x-ray

418 no x-ray for other reason

3 no reason given

2680 x-ray pairs (V1-V8), 16 V8 and no V1 x-ray.

2500 x-ray pairs (V3-V8), 196 V8 and no V3 x-ray

SOF AA cohort, baseline (V7)

There were 483 x-rays. Morphometry was performed on 481 x-rays. Of the 2 not analyzed, 1 was rejected for quality/anatomy reasons, and x-rays were not received from the clinic for the other.

SOF AA cohort, baseline (V8)

348 with V8 clinic visit+ 38 with home visit:

335 with x-rays: 333 with complete morphometry, 2 rejected for quality/anatomy reasons.

5 refused x-ray

14 participant unable to have x-ray

32 no x-ray for other reason

299 x-ray pairs (V7-V8). 34 had V8 and no V7 x-ray, and 182 had V7 and no V8 x-ray.

References

Black DM, Cummings SR, Stone K, Hudes E, Palermo L, Steiger P. A new approach to defining normal vertebral dimensions. *Journal of Bone and Mineral Research* 6(8):883-892, 1991.

Black D, Palermo L, Nevitt MC, Genant HK, Epstein R, San Valentin R, Cummings SR.

Comparison of methods for defining prevalent vertebral fractures: the Study of Osteoporotic Fractures. *Journal of Bone and Mineral Research*, 10(6):890-902, 1995.

Vertebral Morphometry Documentation

Black D, Palermo L, Nevitt MC, Genant HK, Christianson L, Cummings SR. Defining incident vertebral deformity: a prospective comparison of several approaches. *Journal of Bone and Mineral Research*, 14(1):90-101, 1999.