Review: no single physical examination sign rules in or out osteoporosis or spinal fracture

Green AD, Colón-Emeric CS, Bastian L, *et al.* Does this woman have osteoporosis? *JAMA* 2004;**292**:2890–900

Clinical impact ratings GP/FP/Primary care ★★★★★☆☆ Internal medicine ★★★★★☆☆ Gynaecology ★★★★☆☆☆ Rheumatology ★★★★★★☆ Endocrine ★★★★★★☆

Q In patients with osteoporosis, what is the accuracy of physical examination signs for diagnosing osteoporosis or spinal fracture?

METHODS

Data sources: Medline (1966 to August 2004), hand searches of bibliographies of relevant articles including recent osteoporosis guidelines and 4 clinical skills textbooks, and contact with experts in the field.

Study selection and assessment: studies that included data on the accuracy or precision of the history or physical examination signs for diagnosing osteoporosis, osteopenia, or spinal fracture and that used bone densitometry at any site or documented vertebral fracture as the gold standard. Studies with insufficient data to calculate likelihood ratios were excluded. Study quality was assessed (level 1 [highest] to level 3).

Outcomes: sensitivity, specificity, and positive and negative likelihood ratios.

MAIN RESULTS

14 studies (13 815 patients) met the selection criteria. All but 1 study included women (mean age range 51–80 y). 11 studies (79%) had level 1 criteria, and 3 studies had level 3 criteria. No single physical examination sign ruled in osteoporosis or spinal fracture without needing further testing. Osteoporosis was best detected by weight <51 kg, kyphosis, self reported humped back, or <20 teeth; and spinal fracture was best detected by wall-occiput distance >0 cm, and rib-pelvis distance ⩽2 finger breadths (table). Individual studies that investigated such physical examination signs as height loss, armspan–height difference, grip strength, and hand skinfold thickness had variable or inconclusive results for detecting osteoporosis.

CONCLUSIONS

The most useful physical examination signs for detecting osteoporosis were weight <51 kg, kyphosis, self-reported humped back, and <20 teeth. Wall-occiput distance >0 cm and rib-pelvis distance ⩽2 finger breadths were the most useful physical examination signs for detecting spinal fractures.

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Commentary

Green *et al* have tried to evaluate the accuracy of physical examination signs for diagnosing osteoporosis or spinal fracture. The authors concluded that no single manoeuvre is sufficient to rule out osteoporosis or spinal fractures without further testing. In patients who do not meet current bone mineral density (BMD) screening recommendations, several convenient examination findings (especially low weight) can substantially change the pretest probability of osteoporosis and suggest the need for earlier screening. Wall-occiput distance >0 cm and rib-pelvis distance <2 finger breadths suggest the presence of occult spinal fractures.

From an evidence-based perspective, none of these manoeuvres can, as a single manoeuvre, rule out osteoporosis or spinal fractures. The authors also provide the prevalence of osteoporosis and vertebral fractures for these physical examination findings, which is an important addition to relative risk estimates. More focus should be shifted to prevalence or the absolute risk of a fracture. It would be interesting to find out whether a combination of clinical risk factors and physical examination signs could enhance the predictive ability.

Other attempts to identify patients at high risk of osteoporosis or a high absolute risk of fractures include asking simple questions. For example, have glucocorticoids ever been used? Does the patient smoke, drink, have a history of fracture, or have a family history of fracture or secondary osteoporosis? In addition, existing tools such as the osteoporosis risk assessment instrument (ORAI) in the CaMos study can be used to identify women with low BMD and to predict osteoporosis based on clinical risk factors.[1] Although the sensitivity of ORAI was high (93%), the specificity was low (46%), which is expected with most risk scores. All these can be used separately or together with physical examination signs to more accurately predict the absolute fracture risk for a patient and to determine an intervention or the need for a BMD measurement.

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1 Cadarette SM, Jaglal SB, Kreiger N, *et al.* Development and validation of the Osteoporosis Risk Assessment Instrument to facilitate selection of women for bone densitometry. *CMAJ* 2000;**162**:1289–94.

Physical examination signs for detecting osteoporosis or spinal fracture in postmenopausal women*

Signs for osteoporosis	Number of studies (n)	Sensitivity	Specificity	+LR (95% CI)	−LR (CI)
Weight <51 kg	1 (1873)	22%	97%	7.3 (5.0 to 10.8)	0.8 ((0.7 to 0.9)
Self reported humped back	1 (2577)	20.6%	97%	3.0 (2.2 to 4.1)	0.85 (0.8 to 0.9)
Kyphosis	1 (610)	25%	92%	3.1 (1.8 to 5.3)	0.8 (0.7 to 1.0)
<20 teeth	1 (190)	27%	92%	3.4 (1.4 to 8.0)	0.8 (0.6 to 1.0)
Signs for spinal fracture					
Wall-occiput distance >0 cm	1 (216)	60%	87%	4.6 (2.9 to 7.3)	0.5 (0.3 to 0.6)
Rib-pelvis distance ⩽2 finger breadths	1 (781)	88%	46%	3.8 (2.9 to 5.1)	0.6 (0.5 to 0.7)

*Diagnostic terms defined in glossary.