

Usefulness of trabecular bone score in a misdiagnosed case of osteoporosis: clinical image of a woman with multiple fractures

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Trabecular bone score (TBS) is a new diagnostic tool that improves identification of new patients who are at risk of fractures due to the deteriorated bone microarchitecture. Currently, bone mineral density (BMD) assessment is the gold standard for osteoporosis diagnosis. However, a number of fractures occur in patients with osteopenia.¹ In addition, TBS has been considered a BMD-independent risk factor for fractures.

We report the case of a 68-year-old postmenopausal woman who experienced pelvic, thoracic, and lumbar spine pain without any previous injury. Computed tomography revealed advanced bone loss, compression fractures of the L1, L2, L5

vertebral bodies, hemangioma in the L3 vertebral body, fractures of the Th10, Th11 vertebral bodies, the lower right pubic bone branch, and lateral surface of the sacral bone. Basic laboratory tests, calcium, phosphorus, vitamin D, thyroid stimulating hormone, parathyroid hormone concentrations, serum protein electrophoresis, calcium and phosphorus 24-hour excretion remained within normal ranges. Additionally, the patient complained of heartburn, and gastroscopy revealed gastroesophageal reflux. Dual X-ray absorptiometry (DXA) of the spine was performed (FIGURE 1A). Unfortunately, L1, L2, L3 vertebral bodies could not be evaluated because of compression fractures in L1 and L2 and

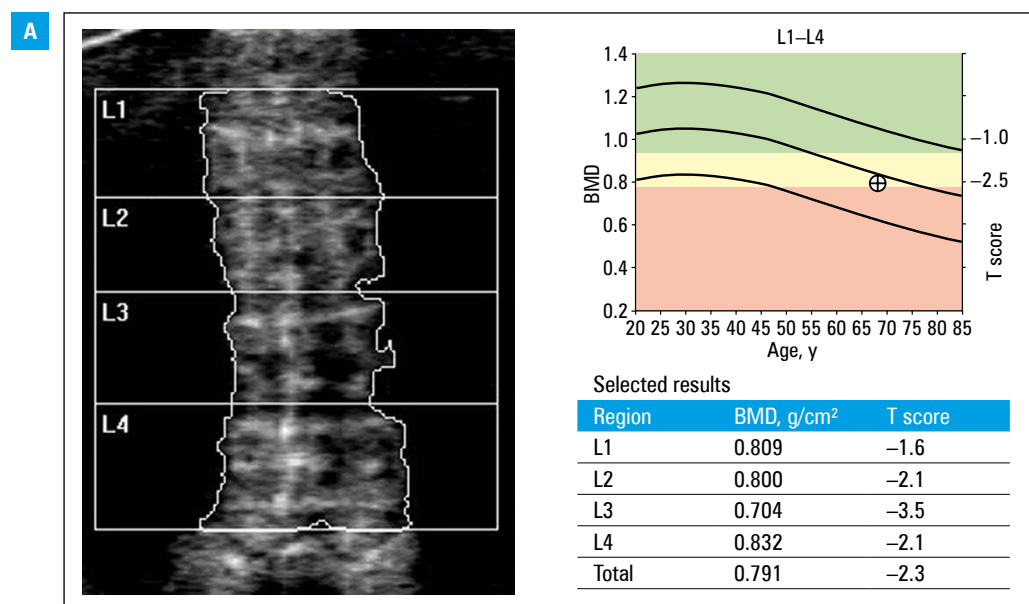


FIGURE 1 A – lumbar spine dual X-ray absorptiometry: T score value of –2.3 indicates osteopenia. Report is not suitable for analysis due to hemangioma (arrow) in the L3 vertebral body and compression fractures in L1 and L2 vertebral bodies. Significantly lower bone mineral density (BMD) value in L3 compared with adjacent vertebrae is typical of hemangioma

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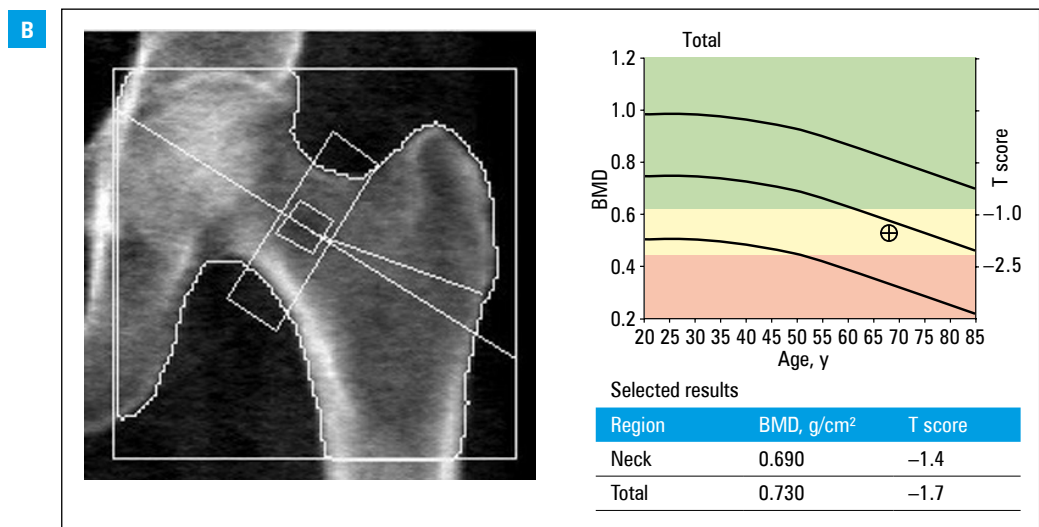


FIGURE 1 B – proximal femur dual X-ray absorptiometry: a T score value of -1.7 indicates osteopenia

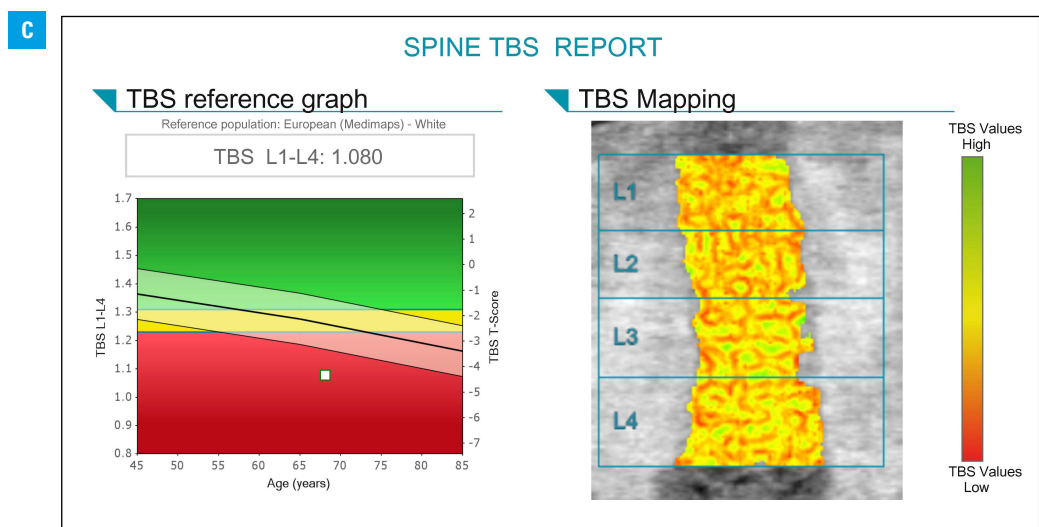


FIGURE 1 C – lumbar spine trabecular bone score (TBS): trabecular bone score L1 to L4 value of 1.080 indicates strongly deteriorated bone microarchitecture

hemangioma in L3. DXA of the proximal femur revealed total hip T score of -1.7 corresponding to osteopenia (FIGURE 1B). As the physicians were convinced that she has severe osteoporosis, the distal one-third of radius DXA of the nondominant forearm was performed, which indicated osteopenia with a T score of -1.9 (Supplementary material, Figure S1). Additionally, TBS of the spine was evaluated and revealed markedly deteriorated bone microarchitecture (FIGURE 1C). The patient received denosumab due to contraindications for oral bisphosphonates.

The evaluation of TBS is possible using a software compatible with densitometers. It helps assess the microarchitecture of trabecular bone on the spine DXA images as it shows the bone texture inhomogeneity (“holes” and “fills”). Studies have shown an incremental improvement in fracture prediction when TBS is used with the Fracture Risk Assessment Tool (FRAX).² The official position of the International Society of Clinical Densitometry (ISCD) is that TBS values are associated with risk of

vertebral, proximal femur, and other major osteoporotic fractures in postmenopausal women and in men over the age of 50 years. Trabecular bone score can be used with the FRAX calculator to predict fractures. However, TBS should not be used alone to decide on a treatment in clinical practice, because it is not currently included in the guidelines.^{2,3} Falsely high results due to osteoarthritis are not shown on TBS, which is its great advantage. Furthermore, TBS may play a role in the evaluation of fracture risk in secondary osteoporosis (ie, primary hyperparathyroidism, glucocorticoid-induced osteoporosis, etc).^{2,4,5}

In our case, TBS L1–L4 numerical value was 1.080, which points to markedly deteriorated bone microarchitecture. Values above 1.35 are considered correct, between 1.2 to 1.35, intermediate, and below 1.2, incorrect, indicating osteoporosis.⁴

Our case shows that TBS identifies patients who are presently underdiagnosed, because they do not meet the BMD criteria of osteoporosis.

SUPPLEMENTARY MATERIAL

Supplementary material is available with the article at www.mp.pl/paim.

ARTICLE INFORMATION

NOTE AN-P was assigned an online identifier (ORCID ID, <https://orcid.org/0000-0003-2365-1079>).

CONFLICT OF INTEREST None declared.

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