

BONE AND MENOPAUSE: THRESHOLD OF INTERVENTION

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ABSTRACT

Menopause comes with different changes including estrogen deficiency – related qualitative and quantitative progressive skeleton deterioration. The physiological process turns to pathology, respective osteopenia and osteoporosis at central DXA (Dual-Energy X-Ray Absorptiometry) or low lumbar – DXA derived TBS (Trabecular Bone Score) or increased 10-year probability of major osteoporotic/hip fractures provided by FRAX. We aim to briefly introduce the methods of menopausal fracture risk assessment if back pain is presented from an endocrine point of view.

This is a vignette type of manuscript focusing on imagery tools. A 60-year old smoker woman with 10 years since menopause and prior corticotherapy accuses persistent back pain for a few weeks, with mild to medium intensity and responsive to small doses of pain medication. Profile plain X-Ray showed no vertebral fractures. FRAX estimated risk was low. Lumbar DXA (GE Lunar Prodigy) showed osteopenia (a T-score of -1.9 SD) while TBS showed a deterioration of lumbar micro-architecture based on a value of 1,199. Further recommendations of stop smoking, healthy diet, physical exercise, vitamin D and calcium supplementation are necessary. Re-testing using DXA is not necessary sooner than 2 years or even longer. Related to back pain, rheumatologic and balneology support and intervention are required for spondylarthrosis.

For daily practice, the approach of bone health and estimation of future fragility fractures in menopause combines gold standard DXA to most modern instrument TBS together with easy accessible online algorithms as FRAX. These do not display individual medical decision and adequate use of guidelines.

Keywords: menopause, bone, fracture, DXA, TBS, FRAX

INTRODUCTION

Menopause comes with different changes including estrogen deficiency – related qualitative and quantitative progressive skeleton deterioration. (1-4) The physiological process turns to pathology, respective osteopenia and osteoporosis at central DXA (Dual-Energy X-Ray Absorptiometry) or low lumbar- DXA derived TBS (Trabecular Bone Score) or increased 10-year probability of major osteoporotic/hip fractures as FRAX algorithm calculates. (1-4) It is now unanimously recognized the variety of investigation tools in the field of menopause – related bone and associated difficulties of daily practitioners to adapt the results for each patient’ needs. Moreover, in less severe cases, when thresholds of intervention are not reached, the recommendations of lifestyle changes and timing of

re-assays by using these tools are necessary to be detailed. (5)

OBJECTIVE

We aim to briefly introduce the methods of fracture risk assessment in front of menopausal woman with back pain from an endocrine point of view.

MATERIAL AND METHOD

This is a vignette type of manuscript focusing on imagery tools for potential osteoporotic status. The references are based on PubMed research. The presented female case is a patient from a Tertiary Romanian Endocrinology Centre. The subject signed an informed consent to anonymously use her medical records.

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CASE REPRESENTATION

This is a 60-year old Caucasian woman who is a current smoker and has 10 years since spontaneous menopause. More than a decade ago she was exposed to corticotherapy for a few months due to a rheumatologic condition. Currently, she accuses persistent back pain for a few weeks, with mild to

medium intensity and responsive to small doses of pain medication. Her GP (general practitioner) has referred her to an endocrinology check-up after checking usual biochemistry tests which were within normal ranges. She has no other significant prior medical or surgical condition. On admission, the profile plain X-Ray showed no vertebral fractures. (Fig. 1) We used FRAX model to estimate

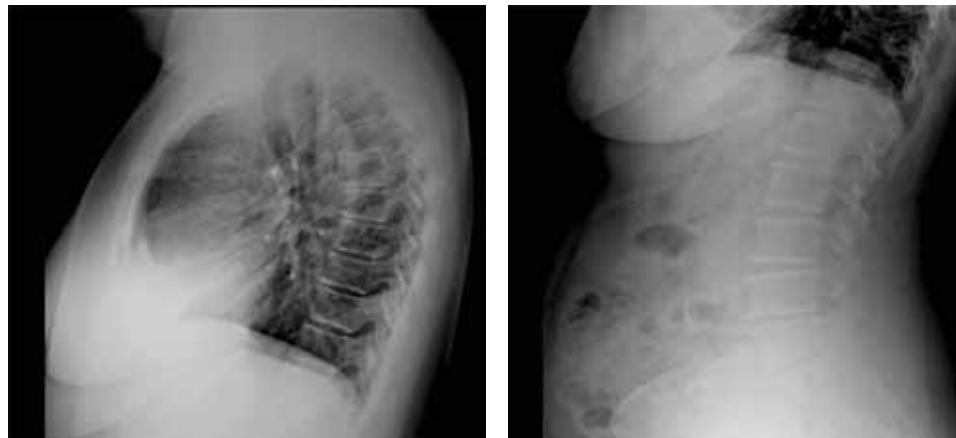


FIGURE 1. Plane profile X-Ray at thoracic and lumbar level of a 60-year old smoking woman complaining of recent back pain

The screenshot shows the FRAX® Fracture Risk Assessment Tool website for Romania. At the top, there's a navigation bar with links for Home, Calculation Tool, Paper Charts, FAQ, References, and English. A yellow logo on the left features a stylized bone structure. The main section is titled "Calculation Tool". Below it, a message says: "Please answer the questions below to calculate the ten year probability of fracture with BMD." There are several input fields: "Country: Romania", "Name/ID: [input field]", and "About the risk factors". The "Questionnaire" section contains 12 risk factors with dropdown menus and radio buttons. The "Answers" section shows the following results:

Risk Factor	Value
1. Age (between 40 and 90 years) or Date of Birth	60
Age:	60
Date of Birth:	[input field]
10. Secondary osteoporosis	<input checked="" type="radio"/> No <input type="radio"/> Yes
11. Alcohol 3 or more units/day	<input checked="" type="radio"/> No <input type="radio"/> Yes
12. Femoral neck BMD (g/cm ²)	Select BMD [dropdown menu] [input field]
2. Sex	<input checked="" type="radio"/> Male <input type="radio"/> Female
3. Weight (kg)	78
4. Height (cm)	164
5. Previous Fracture	<input checked="" type="radio"/> No <input type="radio"/> Yes
6. Parent Fractured Hip	<input checked="" type="radio"/> No <input type="radio"/> Yes
7. Current Smoking	<input checked="" type="radio"/> No <input type="radio"/> Yes
8. Glucocorticoids	<input checked="" type="radio"/> No <input type="radio"/> Yes
9. Rheumatoid arthritis	<input checked="" type="radio"/> No <input type="radio"/> Yes

A red summary box displays the results:

BMI: 29.0
The ten year probability of fracture (%) without BMD

Fracture Type	Probability (%)
Major osteoporotic	6.2
Hip Fracture	1.6

Interpreteaza

On the right side of the page, there are conversion tools for weight (Pounds to kg) and height (Inches to cm), both with "Convert" buttons. A Romanian flag icon is also present. At the bottom right, there's a box with the number 00053780 and the text "Individuals with fracture risk assessed since 1st June 2011".

FIGURE 2. Calculation of FRAX-derived 10-year probability of major osteoporotic, respective hip fracture using online free site adapted for Romanian population

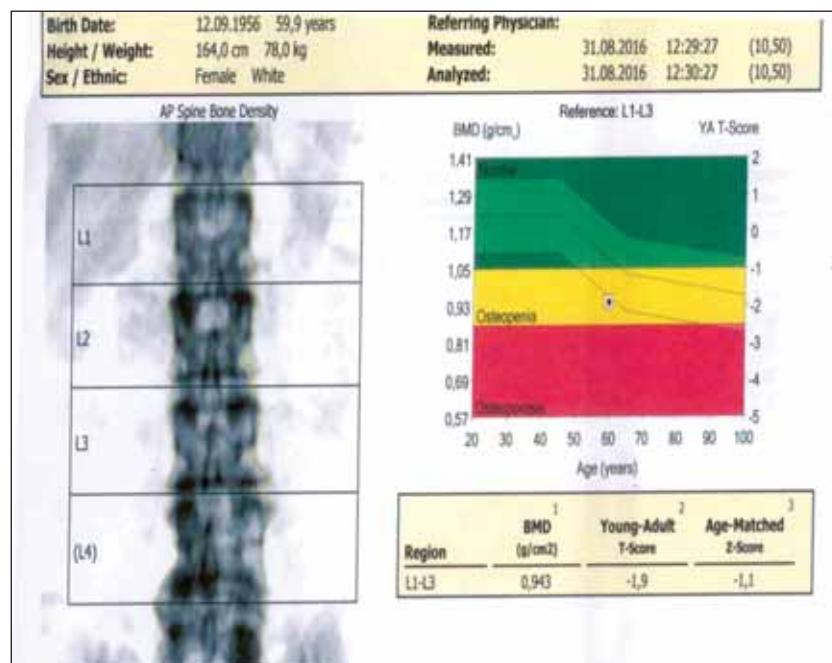


FIGURE 3. Lumbar DXA of a 60 – year old smoking female (GE Lunar Prodigy device)

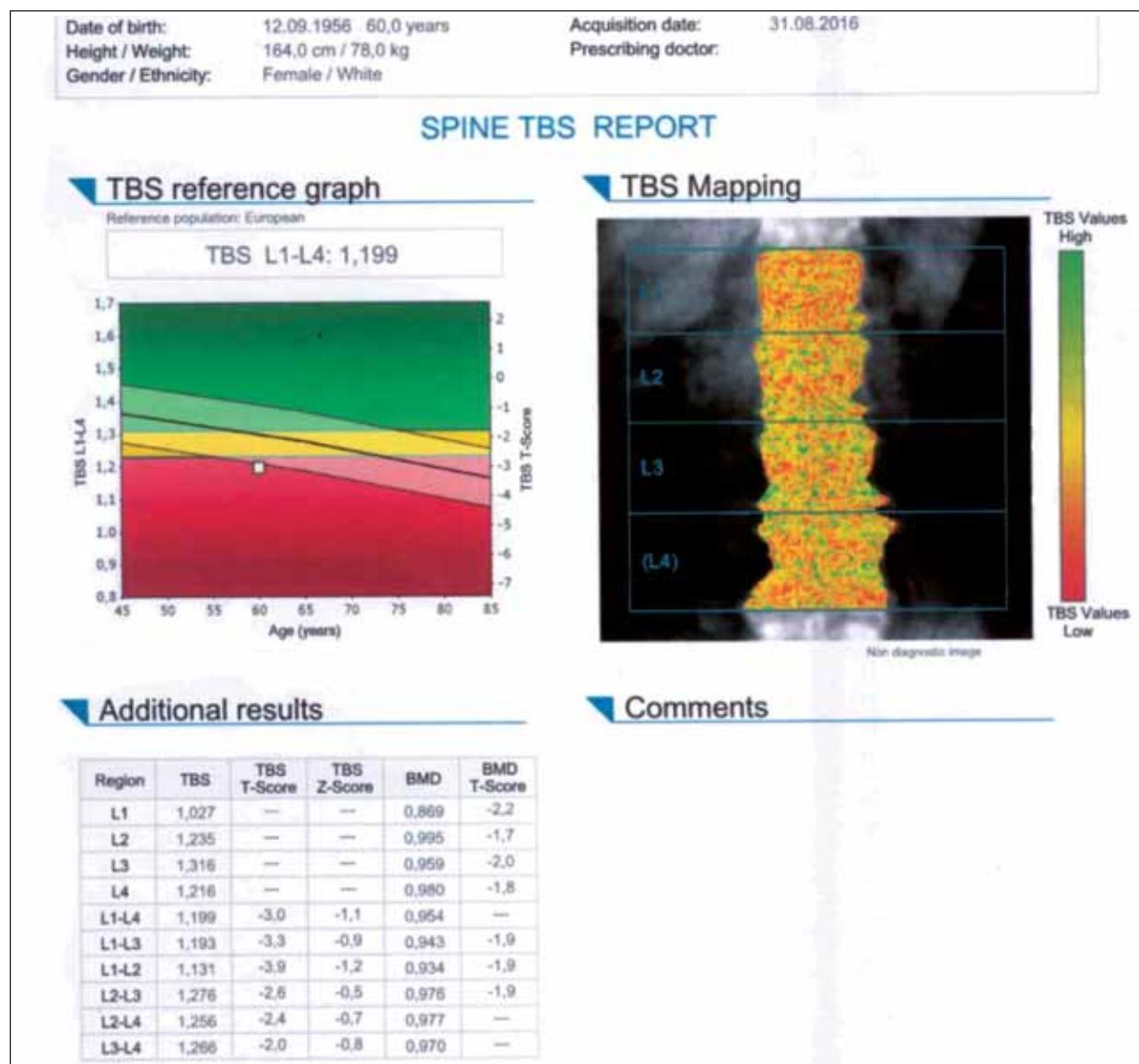


FIGURE 4. Lumbar- DXA- associated TBS on a Caucasian female of 60 years old

future fragility fracture risk which turned up to be low. (6) (Fig. 2) Since a decade has past from her last menstruation, a lumbar DXA scan was performed using a GE Lunar Prodigy machine. The results revealed menopausal osteopenia by using Bone Mineral Density (BMD) – derived T-score. (Fig. 3) Applying the iNsight TBS software attached to DXA device we provided TBS that showed a deterioration of lumbar micro-architecture based on a value of 1,199. (7) Further recommendations of stop smoking, healthy diet, physical exercise, vitamin D and calcium supplementation are necessary. Re-testing using DXA is not necessary sooner than 2 years or even longer. Related to back pain, rheumatologic and balneology support and intervention are required.

DISCUSSION

This is a menopausal female case to whom osteopenia was discovered even this is not directly involved in her back pain. Since no prevalent vertebral fractures are found and the risk of future osteo-

porotic fracture is low, no interventional threshold is reached to start specific anti-osteoporotic drugs as anti-resorptives. Most probably, a spondylarthrosis is the only cause of complains. However, the clinical case presents a discrepancy between quantitative aspects as revealed by DXA BMD and qualitative point of view as revealed by TBS which found very low indices. Current guidelines do not strictly define to threshold of therapy intervention based only on TBS despite its independent power of fracture prediction and its assimilation in risk calculators as FRAX and every day recommendations is soon to be done. (7-10)

CONCLUSION

For daily practice, the approach of bone health and estimation of future fragility fractures in menopause combines gold standard DXA to most modern instrument TBS together with easy accessible online algorithms of estimation as FRAX. These do not display individual medical decision and adequate use of guidelines.

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