TBS CLINICAL UPDATE SUPPLEMENT ARTICLE

Highlights of TBS at the ASBMR

ASBMR 2013 congress was an exceptional vintage for TBS with no less than 33 presented studies. Among them, 4 have been presented orally and cover diagnostic, prognostic, secondary osteoporosis and treatments effects fields. You will find below a summary of the results presented by the speakers:

TBS Oral Presentation 1
TBS Oral Presentation 2
TBS Oral Presentation 3
TBS Oral Presentation 4

TBS Discrimination ability for severe spine osteoporosis

From Cochin hospital in Paris (France), Karine Briot et al. have demonstrated that TBS improved, over the BMD, the detection of patients having vertebral fractures as well as their severity.

This study involved 362 subjects over the age of 50 years who had sustained low trauma fractures. Among them 50.3% had a hip fracture.

TBS Prediction of vertebral fracture in the Rotterdam Study

Biljana Atanasovka et al. have shown that TBS is associated with the presence of prevalent fracture and can predict the osteoporotic vertebral fracture in elderly women.

This study involved 2760 women over the age of 50 years followed during at least 3 years.

TBS Sensitivity in patients under glucocorticoids

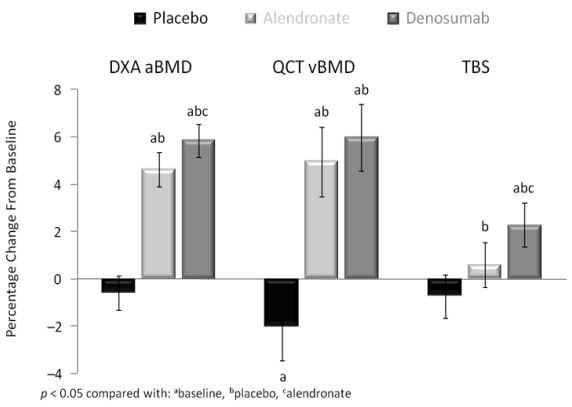
Edward Leib et al. have presented new data on the current and past use of glucocorticoids on bone confirming that TBS outperform BMD in terms of sensitivity. In addition, past use of glucocorticoids has a negative effect on microarchitectural texture which is similar to the presence of an osteoporotic fracture.

This study involved 362 women aged 40 and older receiving glucocorticoids (≥ 5mg/day for ≥3months). Among them 9% had past use of glucocorticoids.

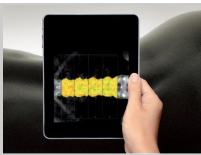
TBS Responsiveness to osteoporosis treatments

Finally, a double-blind, double-dummy fashion study to Denosumab, branded Alendronate or placebo for 12 months have been presented by Thierry Thomas et al. Volumetric BMD (assessed by QCT), areal BMD and TBS (assessed by DXA) decreased with placebo; were maintained or increased under Alendronate; and improved under Denosumab, in comparison with both placebo and Alendronate with no correlations between TBS and BMDs modifications.

This study involved 73, 68 and 74 women receiving respectively Denosumab or Alendronate or the placebo during 12 months. TBS, as well as BMDs, were evaluated at baseline and at 12 months.



In the next pages you will find the exhaustive list of studies presented at the ASBMR 2013



TBS Discrimination Ability — 6 Studies

TBS in severe spinal OP patients by K. Briot, France (Oral presentation):

From Cochin Hospital in Paris (France), a study has demonstrated that TBS was able to identify vertebral fractures as BMD. In osteoporotic patients, TBS discriminated vertebral fractures better than BMD.
In population with recent non traumatic fracture, TBS and BMD may be combined to improve vertebral fracture detection.
This study involved 362 subjects (280 women, 82 men): 182 with hip fracture, 189 osteoporotic patients, 49 under osteoporotic treatment. Mean age 74.3±11.7 years.

Improvement by combining TBS and Lumbar Spine BMD (LS BMD) by R. Rashkov, Eastern Europe (Poster):

The Eastern Europe study has shown that TBS was similar to BMD in terms of sensitivity, specificity and accuracy to identify osteoporotic fractures. However, TBS and BMD combined improved significantly the sensitivity and overall accuracy of osteoporotic fracture detection compared to TBS alone (+22%) and BMD alone (+28%).
This study involved 1253 women with no significant differences in baseline characteristics. Mean age 63.3±8.8 years. BMD and TBS were moderately correlated (r^2 = 0.15).

TBS associated with vertebral and non vertebral fractures in men by S. Boutroy, France (Poster):

The STRAMBO study has shown that TBS, Lumbar Spine BMD (LS BMD) and Total Hip BMD (TH BMD) were lower in men with prevalent fractures. The magnitude of association with all types of fractures is similar for TBS, LS BMD and TH BMD. However, by combining osteoporotic with osteopenic men in the lowest quartile of TBS, the prediction of vertebral fractures is 3 times superior to the one obtained by BMD alone (40.9% vs. 13.4%).
This study involved 886 men: 164 with vertebral fractures, 70 with osteoporotic fractures, 74 with peripheral fractures, 20 both. Mean age 50 years and over.

TBS in women with and without Fragility Fractures by M. R. Mascarenhas, Portugal (Poster):

Another study was interested in identification of osteoporotic fractures. This study demonstrated that TBS was significantly lower in patients with osteoporotic fractures (1.255 vs. 1.32 in average) whereas BMD was not different between the 2 groups. TBS combined with BMD may improve osteoporosis management.
This study involved 155 women: 79 with osteoporotic fracture, 76 without. Mean age 65.85±9.05 years. No significant correlation between TBS and BMD.

TBS, BMD and Hurst Exponent (H) in Fracture Discrimination by J. Touvier, France (Poster):

In Orléans, two parameters of texture and their fracture discrimination ability were evaluated: H and TBS. The results showed lower TBS, H, Lumbar Spine BMD and Total Hip BMD values in women with fragility fractures than in women without fracture. By combining TBS and BMD or H and BMD, the discrimination power was improved by more than 30% compared to BMD alone. The combination of H, TBS and TH BMD improved the fracture detection even more since 73% of the overall fracture were in the first tertile taken into account in this model. Both H and TBS parameters have a significant clinical added-value for fracture detection over BMD.

This study involved 272 women: 96 with fragility fractures. Mean age 66.5±10 years. The correlation was modest between BMD and H or BMD and TBS (r^2=0.09 to 0.25), and poor between H and TBS (r^2=0.0841)

Bone Shock Absorbance (BSA) and TBS in Patients With Osteoporosis, With and Without Vertebral Fracture by N. Watts ,USA (Poster not presented during the congress):

N.Watts has showed that BSA and TBS are significantly lower in patients with vertebral fractures. BSA and TBS provided additional information to DXA. The correlation between TBS and BMD was not significant.

This study involved 67 women: 28 with vertebral fracture, 39 without. Mmean age 71±4.2 years.

TBS Fracture Prediction Ability — 6 Studies

MANITOBA: TBS combined with FRAX improves Fracture Prediction by W. Leslie, Canada (Poster):

The Manitoba study has shown that TBS is lower in patients with vertebral fractures and FRAX probabilities increased in these patients. When combining TBS and FRAX in a model: For patients belonging to the lowest tertile of TBS, the probability to sustain a major osteoporotic fracture or a hip fracture increased the FRAX by 25% and 30% respectively. For patients belonging to the highest tertile of TBS, the probability to sustain a major osteoporotic fracture decreased by 21% and the probability to sustain a hip fracture was not modified. By using TBS in combination with FRAX, the fracture prediction was improved.
This study involved 42,170 women: 2661 with major osteoporotic fractures and 674 with hip fractures. Follow-up: 5.6 years. Mean age 65.7 ± 9.5 years.

JPOS: TBS Predicts Vertebral Fractures (VFx) in Japanese Women by M. Iki, Japan:

The data of JPOS study have been presented on vertebral fractures prediction with TBS over 10 years.
Lower TBS was associated with higher risk of vertebral fractures over 10 years independently of BMD in Japanese women. The risk of vertebral fractures was higher in osteopenic patients belonging to the lowest TBS tertile than osteoporotic patients belonging to the highest TBS tertile. The combination of TBS and BMD improved significantly classification accuracy.
This study involved 685 women aged from 50 to 79 years old: 102 with incident Vertebral Fracture; Follow-up 10 years.

TBS, FRAX and BMD in Vertebral Fractures (VFx) prediction by P. Elders, Netherlands (Poster):

The team of Netelenbos has shown that TBS predicted vertebral fractures independently of BMD and of FRAX. The addition of TBS in the combined model with FRAX (without BMD) and BMD improved significantly the prediction even if the added-value was small. FRAX remained the best single predictor of prevalent fracture.
This study involved 3601 women: 1512 with previous fractures, 576 with apparent vertebral fractures. Mean age 64.4 ± 11.4 years.

OSTEOLAUS: Sensitivity and specificity of vertebral fractures predictability by combining FRAX and TBS by O. Lamy, Switzerland (Poster):

The Osteolaus study has shown that combining FRAX and TBS parameters enabled to reach a sensitivity of 50% and the specificity of 89.9% for vertebral fractures. The results of this combined model are better and well-balanced that the sensitivity (TBS: 51.5%; FRAX: 38.7) and specificity (TBS: 71.1; FRAX: 94.5%) levels obtained for each parameter alone. This increased the discrimination of vertebral fractures (+2.5%) and improved the reclassification of vertebral fractures (+7.6%). By using this combination model of TBS with FRAX, the fracture prediction could be significantly improved in clinical practice.
This study involved 911 women. Mean age 65.2±7.9 years. A low correlation was found between TBS and BMD (r^2=0.16).

ROTTERDAM STUDY: Prediction of Vertebral Fractures (VFx) by TBS in elderly women by B. Atanasovska, Netherlands (Oral Presentation):

The Rotterdam study has shown that both TBS and BMD are significantly lower in patients with fracture than without fracture. Low TBS was significantly associated with the presence of prevalent VFx (RSI + RSIII). TBS was borderline non-significant (p=0.08) associated with incident VFx (RSI + RSII), due to the low number of incident VFx (n=21).
This study involved 2760 women from 3 cohorts, Follow-up of 3 years:
RSI (mean age 75.5 ± 6.0 years), BMD measured during the 3rd follow-up,
RSII (mean age 69.2 ± 7.4 years), BMD measured during the 1st follow-up
RSIII (mean age 58.0 ±- 7.1 years), BMD measured during the baseline
A low correlation between TBS and LS BMD existed (r^2=0.0625 to 0.09, p<0.001)

MANITOBA: TBS predicts osteoporotic hip fractures in men by W. Leslie, Canada (Poster):

In the Manitoba cohort has been demonstrated that TBS was significantly lower in patients with major osteoporotic fractures, hip fractures and clinical cervical fractures. After adjustment for Clinical risk factors (FRAX without BMD) and BMD, TBS remained significant for hip fracture prediction.
This study involved 3620 men: 183 with major osteoporotic fracture, 91 with clinical cervical fracture, 46 with hip fracture. Follow-up 4.5 years. Mean age 67.6 ± 9.8 years.
Modest correlation between TBS and BMD has been found r^2=0.0961.

PROGNOSTIC — 6 Studies

TBSiNsight
Easy access to bone microarchitecture

Type 2 Diabetes: TBS in Type 2 Diabetes Mellitus by R. Dhaliwal, US (Poster):

TBS was lower in patients with diabetes than in healthy patients (1.218 vs. 1.298 in average) whereas BMD was higher in patients with diabetes (1.165 vs. 1.051g/cm2 in average).
Microarchitecture was altered by type 2 diabetes, showing that TBS and BMD displayed opposite performance.
This data suggests that TBS assessment may explain the paradox of fractures in Diabetic patients with good BMD.
This study involved 37 women with type 2 diabetes and 43 controls aged from 30 to 90 years old.

Type 2 Diabetes : TBS in Type 2 Diabetes Mellitus by M . Rubin, US (Poster):

This US study analyzed the impact of diabetes on TBS, to confirm the results of W. Leslie et al previous study, by comparing DXA (BMD and TBS) and HRpQCT data. BMD did not differ from type 2 diabetic patients and controls at the spine, hip or forearm (0.92 vs. 0.938g/cm^2 at lumbar spine in average) while TBS was lower in patients with diabetes (1.15 vs. 1.27 in average). The trabecular heterogeneity at tibia was higher in patients with diabetes (0.397 vs. 0.259 in average). Considering these results, low TBS may be associated with a defect of mineralization. These results can help to better evaluate the fracture risk in Type 2 Diabetes subjects with normal BMD.
This study involved 14 post-menopausal women with type 2 diabetes and 21 controls. Mean age 58 years.

CORTICOÏDS: TBS Sensitivity in patients under glucocorticoïds (GCs) by E. Leib, US (Oral Presentation):

E.Leib has shown that in GCs treated subjects, TBS was lower in subjects with major osteoporotic fractures than in subjects without fracture while no difference was observed with BMD. In the whole treated population and at iso current dose, subjects with past GCs treatments had a lower TBS than those with only the current treatment. Still, no difference was observed on BMD.
In a sub-analysis based on fracture stratification: in patients without fractures, TBS was lower in past GCs treated subjects than current treated subjects. In patients with major osteoporotic fractures, no difference was observed in TBS between past and present GCs users. TBS was a reliable tool for patient with treatment.
This study involved 362 women with GCs treatment. Mean age 62.0±11.2 years.
Low correlation between BMD and TBS has been found (r^2=0.1).

CORTICOÏDS : Influence of glucocorticoids (GCs) on TBS in patients with Rheumatoid Arthritis by V. Povoroznyuk, Ukraine (Poster):

In Ukraine, the impact of GCs in patients with rheumatoid arthritis has been analyzed. 3 groups have been analyzed: patients with no GCs treatment; patients with more than 3 years and 5mg/d GC treatment; patients with less than 6-months GCs treatment during exacerbated crisis.
At baseline, patients without treatment have significant higher TBS than in the 2 other groups whereas BMD was not different. After one year, TBS of GCs users decreased by 5.8% while TBS of non GCs users decreased by 1.4%. TBS reflected bone microarchitecture deterioration for glucocorticoids users with rheumatoid arthritis. It must be monitored during the long-term treatment.
This study involved 134 post-menopausal women with rheumatoid arthritis: 37 without glucocorticoids treatment, 50 with glucocorticoids treatment over 3 years, 47 with glucocorticoids treatment < 6 months. Mean age 52.5±12.8 years.

OSTEOGENESIS IMPERFECTA: OI affects bone microarchitecture by R. Kocijan, Austria (Poster):

The team of Heinrich Resch designed a study to evaluate effect of OI on bone quality and quantity, using HRpQCT and DXA. At both radius and tibia, the presence of OI had a significant negative impact on the trabecular bone compartment (lower BV/TV, lower TbN, higher TbSp) in comparison with age and gender-matched controls. Patients with moderate or severe OI had lower TBS compared with subjects with mild OI.
In OI patients, the trabecular structure is more impacted than the cortical shell which worsens with the severity of OI. HRpQCT and TBS could be useful tool to manage microstructure alteration in OI subjects.
This study involved 11 women and 12 men with OI and 23 controls.
Mean age 45.7 ± 16.4 years. TBS was correlated with BV/TV (r^2=0.27), inhomogeneity (r^2=-0.234), Tb.density (r^2=0.213), BMD LS (r^2=0.245), BMD Hip (r^2=0.518).

TBSiNsight
Easy access to bone microarchitecture

ANDRENAL INCIDENTALOMA: Influence of Andrenal Incidentaloma on TBS by G. Guglielmi, Italy (Poster):

This study has demonstrated that TBS was significantly lower in patients with andrenal incidentaloma compared with age-matched TBS reference values whereas no difference was observed for lumbar spine BMD (LS-BMD). In patients with hypogonadism, both LS-BMD and TBS were significantly lower compared with other subjects of the cohort. In addition, TBS was significantly lower than the TBS reference whereas no difference was observed for LS-BMD. In patients with hypercortisolism, TBS was lower in comparison with TBS reference values. Hypogonadism and Hypercortisolism had negative impact on bone microstructure: TBS was useful for monitoring patient with andrenal incidentaloma.
This study involved 41 women with andrenal incidentaloma: 10 with osteoporosis, 33 with hypogonadism and 11 with hypercortisolism. Mean age 60.6±14.1years

HYPOGONADISM: Male Hypogonadism impact on bone quality by M. R. Mascarenhas, Portugal (Poster):

This Portuguese study showed that male hypogonadal patients had lower spine BMD, TBS and total body lean mass compared to control subjects while no differences have been obtained for age, weight and total body fat mass. Hypogonadism had a negative impact on bone strength and may increase the risk for osteoporotic fractures.
This study involves 108 Hypogonadal and 108 normal men. A weak correlation between spine BMD and spine TBS was detected, validating that TBS is measuring different bone properties than BMD.

CHRONIC KIDNEY DISEASE: TBS in Chronic Kidney Disease (CKD) by E. Leib, US:

E. Leib showed the impairment of microarchitectural texture in CKD subjects at lumbar spine. Patients with CKD had a significantly lower TBS than controls while no significant differences were observed in BMD values.
This study involved 47 women with CKD and 94 age and BMI-matched controls.
10 subjects with CKD had an exposure to glucocorticoids, 1/3 had a thyroid disease and 8 had at least one low energy fracture.
34 women were postmenopausal. A correlation between TBS and BMD existed (r2=0.23). Mean age 55.9±13.3 years.

ANOREXIA NERVOSA: TBS in severe Anorexia Nervosa (AN) by J. Haschka, Austria (Poster):

J.Haschka analyzed TBS in patients with AN. In those patients, BMD decreased significantly at all sites compared with controls (femoral neck 0.850±0.14 vs 1.068±0.11; L1-L4 0.973±0.15 vs 1.292±0.15). Similar findings were obtained for TBS (1.35±0.12 vs 1.56±0.08 in average). Furthermore, lean body mass (LBM) as well as body fat percentage (FP) were also lower in patients with AN (LBM: 32.7±4.0 vs 42.6±5.1; FP: 14.1±8.0 vs 36.1±5.2).
These results have shown that body composition, BMD, TBS and hip geometry were really depreciated by AN.
This study involved 34 patients with AN and 26 controls. Mean age 23.95 ± 3.5 years.

HYPERPARATHYROÏDISM: Evolution of TBS after Parathyroidectomy (PTX) for patients with hyperparathyroidism by B. Silva, US:

At baseline, men had a significant lower TBS than women. After 12 months, there is no significant effect of the PTX on TBS in women (-0.6%) whereas a significant increase was observed in men (+10.3%). These findings are consistent with previous published data on PTX non-effect on microarchitecture using HRpQCT and TBS in women. However this study shows gender differences that were not highlighted before.
This study involved 5 men and 12 women with hyperparathyroidism and with no difference in age, BMI, or serum calcium level. Mean age 65±14 years. Follow-up 12 months after PTX. No correlation between TBS, BMD, High Resolution pQCT.

TBS evolution for Primary Hyperparathyroidism and Hypoparathyroidism patients after successful Parathyroidectomy (PTX) or PTH treatment by B. Silva, US:

This American study demonstrated that TBS was lower in patients with hyperparathyroidism compared with patients with hypoparathyroidism, before and after PTX. One year after PTX in patients with hyperparathyroidism, TBS increased by 3.3% whereas it did not change in patients with hypoparathyroidism under PTH treatment. TBS may be a tool to manage PTH treatments.
This study involved 12 patients with hyperparathyroidism, 12 patients with hypoparathyroidism.
For each group: 8 post-menopausal women and 4 men. Mean age 65±14 years.

TBS Responsiveness to Treatments Effects — 4 Studies

Denosumab Vs Alendronate Vs Placebo: Treatments impacts on TBS in Postmenopausal women by T. Thomas / Amgen, Multicentric study (Oral Presentation):

In this study, postmenopausal women with low BMD were randomized in a double-blind, double-dummy fashion study to Denosumab, branded alendronate, or placebo for 12 months. Lumbar volume BMD, areal BMD, and TBS were measured from scans obtained at baseline and at 12 months.
At 12 months, the placebo group has exhibited a decrease in vBMD, aBMD and TBS compared with baseline.
In the Alendronate group, vBMD, aBMD were increased whereas TBS was maintained.
In the Denosumab group, all 3 parameters significantly increased compared with baseline. The Dmab group was also significantly higher when compared with Placebo or Alendronate groups for these parameters.
TBS modifications percentage were not correlated with BMD modifications.
In conclusion, the evaluated treatments have different impacts on bone microarchitecture as evaluated by TBS suggesting that TBS can been used to monitor therapies.
This study involved 215 post-menopausal women: 73 under Denosumab, 68 under Alendronate, 74 with Placebo treatments. Women aged from 50 to 70.

Cyclic Teriparatide and Raloxifene Treatment Vs. continuous Teripatide Treatment by N. Binkley, US (Poster):

N. Binkley studied 2 sets of teripatide treatments: monthly cycles of teripatide and raloxifene, or a continuous teripatide. The results showed that BMD increased similarly for the two groups of treatments after 6 months. At 6 months, TBS values were unchanged in both groups. In conclusion, the cyclic approach provided similar LS-BMD increase than the continuous treatment. Consistent temporal effects on bone turnover markers were observed with an antiresorptive effect of raloxifene.
This open label study involved 26 osteoporotic postmenopausal women randomly selected to receive one or the other of treatments 'sets. Mean age 67.0 years.

PTH: 4 years effects of PTH in Hypoparathyroidism on TBS by B. Silva, US (Oral Presentation & Poster):

B. Silva has presented the results of a study dealing with effects of PTH treatment on TBS in patients with hypoparathyroidism. At baseline, mean TBS was normal for age (1.429 in average), lower in postmenopausal women compared with premenauposal women (1.358 vs. 1.441) or men (1.358 vs. 1.473 in average).
After a 2 years follow-up, mean TBS increased by 1,4% from baseline and reached a plateau for the next 2 years of treatment, and this, for the entire cohort. Differences have been observed in between the groups from the 18th month: in men and in post-menopausal women, after the plateau was reached TBS remained stable whereas it still increased in pre menopausal women (+2.1% from baseline) to reach their plateau at 2 years of treatment (+2.6%).
TBS is a monitoring solution for patients with hypoparathyroidism under PTH treatment and confirmed the safety of long-term treatment, with a more marked effect on younger individuals.
This study involved 18 premenopausal-women, 10 postmenopausal women and 11 men. Mean age 48±2 years.

PTH: 2 years effects of PTH in Postmenopausal women with Hypoparathyroidism (HypoPT) by S. Chiavistelli, Italy (Poster):

An Italian study has shown the 2 years effects of PTH on TBS in post-menopausal women. At 12, 18 and 24 months, BMD at radius decreased significantly by 2.2%, 3%, and 3.7% respectively. At 18 and 24 months, BMD at lumbar spine increased by 1.44% and 2.52% respectively and an increase of TBS became apparent at 18 months with +3.1% which tended to decrese slightly at 2 years (+2.6% from baseline). After 2 years, trabecular parameters as calculated with HRpQCT increased by 4.9% for trabecular bone volume and 5% for BV/TV while cortical parameters decreased by 5% for cortical area, by 3,8% for cortical volume BMD, by 6% for cortical thickness at both radius and tibia.
PTH therapy in postmenopausal HypoPT women was associated with increases in trabecular indices by HRpQCT and TBS, consistent with improvements in aBMD at the lumbar spine.
In contrast, there was a decrease in cortical measures by HRpQCT at the radius and tibia, as well as aBMD at the cortical 1/3 radius site. Future studies are necessary to determine how these changes alter bone strength in HypoPT.
This study involved 23 postmenopausal women treated with PTH for up to 2 years. Mean age 63±7.8 years.

REFERENCE CURVE: Comparison between the TBS US and French Reference curves by C. Simonelli, US (Poster):

In previous studies were built the French Caucasian and the non-Hispanic White American women TBS reference curves. The aim of this study was to compare the data of both curves.
The age related micro architectural modifications were similar between the US and the French reference data (r^2>0.99). Between 45 and 90 years of age, a piecewise linear decline of -2.53 and -2.58 TBS T-score was observed (vs.-2.38 and -2.32 for BMD T-score) for the US and the French cohorts respectively at L1-L4. In both cohorts, trabecular texture loss rate are exactly similar. After the age of 65, TBS loss is accelerated (-0.004 to -0.006 per year) at L1-L4.

This study involved 512 healthy non-Hispanic white US women and 5942 all-comers French Caucasian women. Aged > 45 years old.

ETHNICITY: Ethnic differences in TBS by W. Leslie, Canada (Poster):

W. Leslie demonstrated in this study that TBS is useful for assessing ethnic differences in bone quality.
From literature we know that White and Asian Women have higher risk of fracture vs Black women: White > Asian > Black;
Although Hip and Spine BMD are as follows: Black > White > Asian.
Concerning lumbar spine TBS, Asian and white women had similar values which were higher than Black women, even after adjustment for hip or spine area: Asian = White > Black.

During the 5.6 years follow up, major osteoporotic fractures occurred in 2626 White vs. 22 Asian women.
Similar fracture risks have been estimated from FRAX with BMD. Significant ethnic differences in spine TBS were observed between ethnic groups: these differences were unrelated to skeletal size, BMI or other covariates and showed a different pattern from BMD differences. Studies in larger populations with more fractures and greater ethnic diversity are necessary.

This study involved 41,187 Caucasian, 739 Asian, 152 Black women aged from 50 to 75 years old.
Mean age 65.4 ± 9.2 years.

ETHNICITY: Association of TBS with cQCT and HRpQCT in Chinese and Caucasian women by B. Silva, US (Poster):

This study has shown that TBS was associated with most HRpQCT and cQCT Trabecular and cortical parameters. However TBS did not differ between Caucasian and Chinese premenopausal and postmenopausal women (1.465±0.091 vs. 1.467±0.064 and 1.336±0.097 vs. 1.318±0.089 repectively).

They have concluded that TBS reflects vBMD and bone microarchitecture derived from high resolution imaging and may be a useful in addition to aBMD to assess central trabecular microstructure between ethnies or other groups with differences in bone size.

This study involved Chinese and Caucasian American women: 71 premenopausal and 44 postmenopausal women . Age was comparable between ethnics groups.

TEHNICAL STUDY: TBS Precision study: a comparison between Prodigy and iDXA by D. Krueger, US (Poster):

The authors demonstrated that the short-term precision of TBS and BMD were comparable with no differences between men and women. They also compared DXA scans of subjects acquired on 2 Prodigy and other scans acquired on multiple Prodigy Vs a iDXA. They have obtained an excellent correlation between the 2 Prodigy (r^2=0.9), and a high correlation between multiple Prodigy and iDXA (r^2= 0.63 - 0.85).
Slight TBS differences between iDXA and Prodigy scans existed probably due to higher resolution on iDXA.

This study involved 180 subjects.
CV(BMD iDXA)=1,9% ~ CV(BMD Prodigy)=1,5%;CV(TBS iDXA)=1,4% ~ CV(TBS Prodigy)=1,6%

PEDIATRICS: Influence of age and gender on TBS and BMD in Spanish infants by R. Winzenrieth, Medimaps, France (Poster):

In this study was evaluated the age-related change of TBS in infants from birth to 2 years old. Lumbar Spine BMD and TBS had the same evolution pattern in male and female infants during this period. Unexpected "U"-shape pattern has been obtained for TBS whereas there was a constant increase of the BMD in both genders. The TBS U-shape could be explained by the body mechanical loading adaptation due to first bed-rest phase followed by the standing phase of infants. Further analysis has to be done to confirm those findings and this hypothesis.

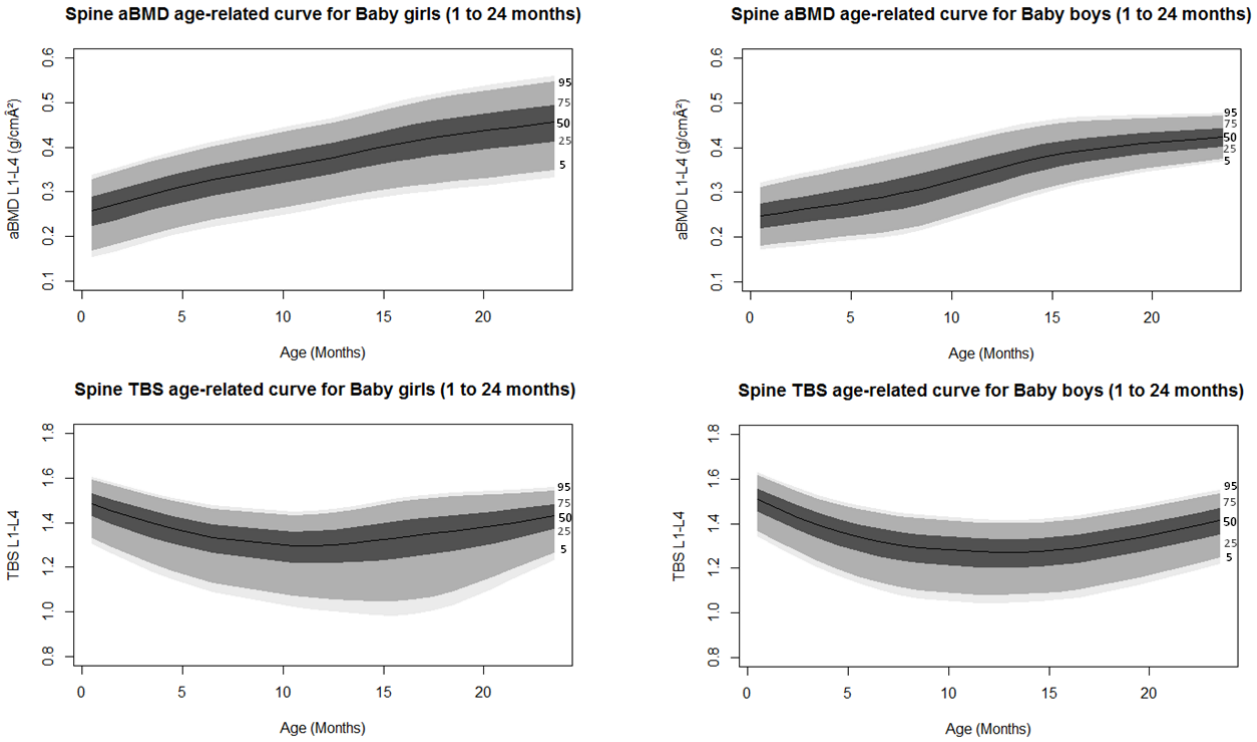


Figure 1: Age-related curves for aBMD and TBS at spine L1-L4 (the black line represented the 50th centile. the Dark gray area representes the 25th to 75th centiles; the medium gray area represented the 95th centiles; the light gray area representes the 3rd to 97th centiles)

This study involved 143 girls, 109 boys aged from birth to 2. Before and after 12 months of age, TBS and aBMD correlations in both female and male infants were low (r^2<0.20).

PEDIATRICS: TBS and BMD evolution during childhood growth in Spanish girls by L. Del Rio, Spain (Poster):

Age-related modification in Spanish girls aged from 2 to 17 years old were evaluated. The study showed that before puberty, areal BMD increased, and then accelerates after puberty. As for TBS we observed first a decreasing phase, followed by an increasing phase after the puberty.
TBS age-related curve may be helpful in combination with BMD curve to identify children with micro architectural alterations induced by chronic diseases or drug therapies.

This study involved 415 healthy girls aged from 2 to 17 years old. Mean age 10.9±4.4 years.
Positive significant correlations exist between TBS and age, BMI, aBMD (r^2= 0.15, 0.073, 0.22 respectively).