

TBS Summer Newsletter 2017

We are sure that you are wondering already what you would read during your vacation by the pool, the beach or on your balcony ... Well, here is our answer: the TBS Summer Newsletter!

The number of TBS publications this year is very impressive and many more will come if we consider all the new studies that were presented (more than 40!) at this year's annual World Congress on Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (WCO IOFESCEO) which took place in wonderful Florence, Italy last March. We have summarized for you some of the most interesting studies and hope you will get deeper insight into TBS by reading these few lines.



TBS & FRAX®

FRAX adjusted for TBS (FRAX-TBS) is becoming more and more an important clinical tool as confirmed by 6 additional studies. Among them, Lundin et al. (P1092), Kuzma et al. (P560) and Zabihyeganeh & Mirzaei (P145) reported that FRAX-TBS is particularly useful in patients whose fracture risk is close to the intervention threshold, in those younger than 65 years and those with secondary causes of osteoporosis. Aubry-Rozier et al. (P776) reported that the fracture probability adjusted for TBS (FRAX-TBS) is lower in physically active than sedentary post-menopausal women (P776). In fact, it is suggested in many studies presented that FRAX-TBS should be, whenever possible, the by-default standard instead of FRAX alone.

TBS IN PATIENTS WITH DIABETES

Among the various conditions leading to secondary osteoporosis, Type II Diabetes kept our attention. The interest in using TBS for such patients is clearly increasing, as shown by the five additional studies on this topic at the IOF congress. The paradox of bone strength among diabetic patients is well recognized; i.e., BMD values alone do not adequately reflect the higher fracture risk in patients with Diabetes (particularly type II). A Belgium research group (Baleanu et al. P832) observed lower TBS values in diabetic patients than in controls

that had similar FRAX score. These results were confirmed in an Australian cohort (Holloway et al. P481). Conversely, in a smaller sample size, Hew et al. (P795), Calvo et al. (P513) did not find significant differences in TBS between diabetic and control patients. The constitution of their study groups in age and/or BMI and the low number of patients may explain these findings.

On a broader level, according to recent published articles (Review article in Osteoporosis Int: Epstein et al 2016, Review article in Calcif Tissue Int: Schater & Leslie 2016), the added value of using TBS for diabetic patients is increasingly confirmed and appeared to be the current most useful imaging approach in clinical routine. As such, the use of TBS in diabetics has been suggested in the guidelines published by both ESCEO and ISCD.

COULD TBS BE USED TO MONITOR TREATMENT?

While guidelines are today inconclusive regarding the use of TBS for treatment monitoring, perhaps due to limited data, Prof. N. Binkley, in a non-sponsored symposium on TBS raised the important question: *“What is the expected effect of medications on BMD and microarchitecture?”* Indeed, from the sparse but current literature, the effect of treatment on TBS differs; little effect is found with bisphosphonates, but a large effect with teriparatide. Furthermore, the response observed on BMD is generally larger than on TBS. Such disparities in results between BMD and TBS are expected due to the mechanism of action as all drugs increase BMD, but most do not improve bone structure. The following table, extracted from Prof. N. Binkley’s presentation provides an overview of what one could expect in term of bone density and microarchitecture upon the treatment mechanism of action. Such a table may help physicians to interpret response or non-response of TBS for a given treatment. More studies are still needed although many of them are about to be published soon.

Medication	Comments	Expected response on BMD	Expected response on microarchitecture
PTH	Bone anabolic	++++	++
<u>Denosumab</u>	Remodeling transient +?	+++	+
Bisphosphonates	Remodeling transient	++	+/-
Estrogen	Remodeling transient	+	-/+
	Menopause	--	--
Glucocorticoids	Structure deterioration	-	--
Aromatase inhibitors	Structure deterioration	-	--

Table extracted from Prof. Binkley’s presentation at IOF 2017

[Click to read Prof. Binkley’s full presentation](#)

TBS WITH REGARD TO BONE STRENGTH

The relation between TBS and biomechanics was again confirmed. Tran et al. (P935)

presented a study showing significant correlation of TBS with vertebral bone strength. 35 ex-vivo vertebrae were mechanically tested in compression. Results showed that TBS assessed on spine DXA was correlated to vertebral stiffness (53%). Another study was conducted on ex-vivo vertebrae with implanted pedicle screws (le Nost et al. P931). They demonstrated an association between TBS as assessed on radiographs and the pull-out strength of the pedicle screws (56%). The link between bone microarchitecture and bone strength seems obvious and confirmed many other previously published studies on TBS either ex-vivo (Roux JP et al. Osteoporos Int. 2013 Sep;24(9):2455-60) or from bone biopsy at the iliac crest (Muschitz C et al. Bone. 2015 Oct;79:259-66). However, one has to keep in mind that TBS is not a direct physical measure but a textural index related to bone microarchitecture. Nevertheless, these studies strengthen TBS' utility by confirming TBS physical meaning on several image modalities.

A PRACTICAL NOTE...

Some DXA devices offer a feature enabling the measurement of the spine without repositioning the patient in between hip acquisition and spine acquisition. In that case, the patient's legs are not elevated on the positioning block but lay flat on the DXA table. Therefore, many colleagues wondered if TBS could be used in such a position. We have the pleasure to announce that this question is now answered by Krueger et al. (P894). Their study focused on legs positioning during DXA spine examination. They observed no significant differences between TBS on scans acquired with patients having their legs elevated on the foam block and without. Similar results were observed for BMD measurements. This finding is of high interest for simplifying the routine DXA examination.

NON-SPONSORED SYMPOSIUM:

CORTICAL POROSITY & TRABECULAR BONE SCORE: ARE BOTH IMPORTANT?

We were very pleased to attend a non-sponsored symposium related to both cortical porosity and TBS. Actually, it was a great success and fully booked. Both cortical porosity and TBS are important in the understanding of bone fragility. Prof. Ego Seeman gave a talk on cortical porosity while Prof. Neil Binkley presented the utility of TBS in clinical practice.

In brief, the clinical utility of TBS is shown in the key messages reported as opinion of Prof. N. Binkley and confirmed by the most recent literature:

- As an independent predictor of fracture, TBS assists with treatment initiation decision by using FRAX-TBS online (or via the TBS software directly in the latest version)
 - When the patient has borderline non osteoporotic BMD or the fracture risk value is close to the intervention threshold
 - When the patient (or the doctor) is reluctant to consider medication and we need an additional argument to (be) reassure(d)
- TBS assists with treatment non-initiation decisions
 - When the patient has low BMD but the patient is of small stature and has good TBS
 - When the patient has low BMD but a good TBS and a low falls risk
- TBS provides insight into fracture risk in those with Diabetes Mellitus or glucocorticoid exposure

- For monitoring, TBS is likely to be useful with anabolic treatment and other situations (e.g. as a safety measure) though there is no consensus guidance available yet.

We hope that this summary gave you a brief overview about the hottest TBS news. If you want to read more:

All listed abstracts are available here

To get deeper into TBS, please review our selection of interesting case studies and do not hesitate to activate your free trial:

Compendium of TBS clinical case

Free 60-day & 250 scans trial

Or contact us

For now, we are wishing you a wonderful summer!

**We hope you will come to visit us at our booth at the
ASBMR 2017 in Denver to discover
our two new novelties!**

See you in Denver in September!

TBS will be also presented on upcoming events:

Santa Fe Bone Meeting - USA, August 4-5

Cartagena - Colombia, August 25-26

ASBMR 2017 Annual Meeting - Colorado, USA, September 8-11

SIOMMMS -Rome, Italy, October 19-21

DKOU - Berlin, Germany, October 24-27

ACR American College of Rheumatology - San Diego, USA, November 3-8

