

CALSCAN Dexa-t

the method

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CALSCAN Dexa-t is the new generation apparatus for bone mineral measurements. With new patented technique and adapted software, CALSCAN Dexa-t is a powerful tool in the management and diagnosis of osteoporosis.

CALSCAN Dexa-t uses dual-energy X-ray absorptiometry and measures simultaneously the thickness at the measurement site with the aid of laserbeams. With this new patented method, Dexa-t (T for thickness), a considerable improvement, compared to previous generation DEXA instruments, of the accuracy of the measured bone mineral value is achieved. With this high accuracy it is now possible to use bone mineral measurements for the diagnosis of the individual

patient. Previous generation DEXA instruments gave errors in the measurements due to various amounts of fat within and around the measured bone, the magnitude of these errors where between 10 and 20%, dependent of equipment used^{3,6,7,9,11}. With the new DEXA-T technique used in CALSCAN Dexa-t these errors have been eliminated and the measured bone mineral values measured with CALSCAN Dexa-t are accurate to within 2%.

Agreement between measured values and actual content of bone mineral for different techniques.

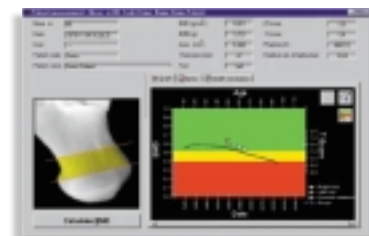
Technique	Measurement site	Accuracy (%)	Reference
SPA	Lower arm	9	Nielsen 1980 ¹⁰
DPA	Spine, Hip	10	Gotfredsen 1988 ⁴
DEXA	Spine, Hip	13	Louis 1994 ⁷
QCT	Spine	20	Louis 1994 ⁷
Ultrasound	Heel bone	22	McCloskey 1990 ⁸
CALSCAN Dexa-t	Heel bone	2	Kullenberg 1999¹⁰

A high accuracy is necessary when the measurements should be used for diagnosis in the individual patient. If the accuracy of the method used is worse than 4% there will be difficulties in the separation of the healthy individuals from the patients with osteoporosis⁵.

Accuracy should not be confused with precision (reproducibility). The precision of a particular technique is a measure of the stability of the equipment for repeated measurements of the same individual. The precision for present day techniques for bone mineral measurements is about 1% in vivo. The precision is of importance when repeated measurements are to be performed on

the same individual e.g. for following the response to treatment. The accuracy is of importance when the measured bone mineral value of an individual patient is to be compared to a reference population in order to make a diagnosis. A high accuracy is crucial for the ability to make an early diagnosis of patients with bone fragility in order to be able to start treatment at an early stage.

The detector used in CALSCAN Dexa-t is an array of 128 detector elements, these measures the X-ray signal simultaneously and a high-resolution image is achieved. The simultaneous measurement gives that the measurement time is short, just 35 seconds for a complete scan.



The heel bone

CALSCAN DEXA-t measures the bone mineral content in the heel bone.

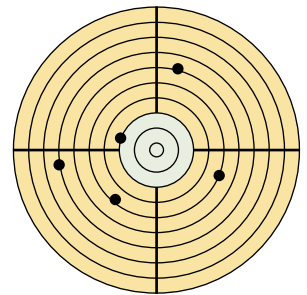
The heel bone is a weight bearing bone comprised of more than 95% trabecular bone tissue. The trabecular bone has a much faster turnover than the cortical bone found in the long bones and spinal processes. The effects of medical treatment, diet and physical exercise is therefore found faster in the trabecular bone than in the cortical bone. Measurements of the bone mineral content in the heel bone have been shown to have a high correlation to measurements of the hip and spine. Several prospective studies have also shown that measurements of the bone mineral content in the heel bone have a high predictive value in finding patients with a high risk of bone fragility fractures. This high predictive value is true for both the hip as well as for other bones in the body^{1,2,12,13}.

The heel bone is also easy to access and no special preparation of the patient is necessary.

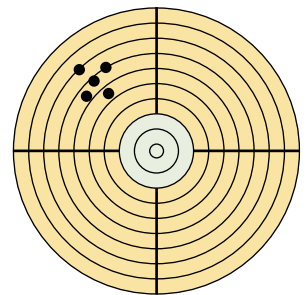
The high accuracy in the measurements with CALSCAN DEXA-t will have a great impact on the diagnostic sensitivity of the measurements, with less overlap between healthy and osteoporotic values, that is it will be much easier to make a safe diagnosis in the individual patient than with previous technologies.

References

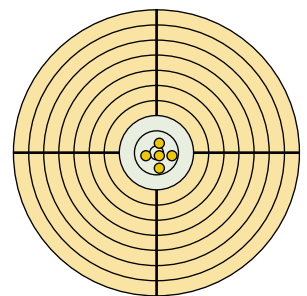
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Low precision
Low accuracy



High precision
Low accuracy



High precision
High accuracy