



Trabecular microarchitecture in established osteoporosis: relationship between vertebrae, distal radius and calcaneus by X-ray imaging texture analysis

Submitted by a.bergoend on Mon, 04/27/2015 - 09:44

Titre	Trabecular microarchitecture in established osteoporosis: relationship between vertebrae, distal radius and calcaneus by X-ray imaging texture analysis
Type de publication	Article de revue
Auteur	Mallard, F [1], Bouvard, Béatrice [2], Mercier, Philippe [3], Bizot, Pascal [4], Cronier, P. [5], Chappard, Daniel [6]
Pays	France
Editeur	Elsevier Masson
Ville	Paris
Type	Article scientifique dans une revue à comité de lecture
Année	2013
Langue	Anglais
Date	2013 Feb
Numéro	1
Pagination	52-59
Volume	99
Titre de la revue	Orthopaedics & Traumatology: Surgery & Research
ISSN	1877-0568
Mots-clés	Aged, 80 and over [7], Calcaneus [8], Female [9], Humans [10], Male [11], Radius [12], Retrospective Studies [13], Spinal Fractures [14], Spine [15]

INTRODUCTION: Osteoporosis is an alteration of bone mass and microarchitecture leading to an increased risk of fractures. A radiograph is a 2D projection of the 3D bone network exposing a texture, that can be assessed by texture analysis. We compared the trabecular microarchitecture of the spine, radius and calcaneus in a series of osteoporotic cadavers.

MATERIALS AND METHODS: Thirty-four cadavers (11 men, 23 women), mean age 85.2 ± 2.1 years, were radiographed from T4 to L5 to identify those with vertebral fractures (FV). Non-fractured vertebrae (NFV), radius and calcaneus were taken and analyzed by densitometry, radiography and texture analysis under run-length, skeletonization of the trabeculae, and fractal geometry.

RESULTS: Six subjects (five women, one man) were selected, mean age 82.5 ± 5.5 years. Twelve calcanei and 10 radii were taken. Two radii were excluded. The texture of NFV was significantly correlated ($P < 0.01$) with that of the radius for horizontal run-lengths. No relationship between the texture of NFV and calcaneus was found.

DISCUSSION: In the horizontal direction (perpendicular to the stress lines), the microarchitecture of NFV and radius showed a disappearance of the transverse rods anchoring the plates. Due to its particular microarchitecture, the calcaneus is not representative of the vertebral status.

CONCLUSION: Bone densitometry provides no information about microarchitecture. Texture analysis of X-ray images of the radius would be a minimally invasive tool, providing an early detection of microarchitectural alterations.

LEVEL OF EVIDENCE: IV retrospective study.

Résumé en
anglais

URL de la notice <http://okina.univ-angers.fr/publications/ua10359> [16]
DOI 10.1016/j.otsr.2012.08.004 [17]
Titre abrégé Orthop Traumatol Surg Res
Identifiant (ID) 23260368 [18]
PubMed

Liens

- [1] [http://okina.univ-angers.fr/publications?f\[author\]=18189](http://okina.univ-angers.fr/publications?f[author]=18189)
- [2] [http://okina.univ-angers.fr/publications?f\[author\]=4629](http://okina.univ-angers.fr/publications?f[author]=4629)
- [3] <http://okina.univ-angers.fr/philippe.mercier/publications>
- [4] <http://okina.univ-angers.fr/p.bizot/publications>
- [5] [http://okina.univ-angers.fr/publications?f\[author\]=14658](http://okina.univ-angers.fr/publications?f[author]=14658)
- [6] <http://okina.univ-angers.fr/daniel.chappard/publications>
- [7] [http://okina.univ-angers.fr/publications?f\[keyword\]=1531](http://okina.univ-angers.fr/publications?f[keyword]=1531)
- [8] [http://okina.univ-angers.fr/publications?f\[keyword\]=16283](http://okina.univ-angers.fr/publications?f[keyword]=16283)
- [9] [http://okina.univ-angers.fr/publications?f\[keyword\]=1075](http://okina.univ-angers.fr/publications?f[keyword]=1075)
- [10] [http://okina.univ-angers.fr/publications?f\[keyword\]=991](http://okina.univ-angers.fr/publications?f[keyword]=991)
- [11] [http://okina.univ-angers.fr/publications?f\[keyword\]=968](http://okina.univ-angers.fr/publications?f[keyword]=968)
- [12] [http://okina.univ-angers.fr/publications?f\[keyword\]=16284](http://okina.univ-angers.fr/publications?f[keyword]=16284)
- [13] [http://okina.univ-angers.fr/publications?f\[keyword\]=6125](http://okina.univ-angers.fr/publications?f[keyword]=6125)
- [14] [http://okina.univ-angers.fr/publications?f\[keyword\]=16285](http://okina.univ-angers.fr/publications?f[keyword]=16285)
- [15] [http://okina.univ-angers.fr/publications?f\[keyword\]=10330](http://okina.univ-angers.fr/publications?f[keyword]=10330)
- [16] <http://okina.univ-angers.fr/publications/ua10359>
- [17] <http://dx.doi.org/10.1016/j.otsr.2012.08.004>
- [18] <http://www.ncbi.nlm.nih.gov/pubmed/23260368?dopt=Abstract>