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OSTEOPOROSIS INTERNATIONAL

with other metabolic bone diseases

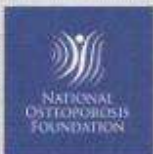
EDITORS-IN-CHIEF JOHN A. KANIS AND ROBERT LINDSAY

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Mesostructure and Atomic Mineral Composition in Osteoporosis.

Z.Noor., M.Hidayat., A.H. Rahim., S.B. Sumitro.



International Osteoporosis
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 Springer

TWW was also greater in HJ₈₀ compared to all the groups. In FWW, there were significantly greater values in all the groups compared to sedentary (C) group, meanwhile there was significantly greater value of FWW in HJ₈₀ compared to all the other groups. In reproductive hormones, LH levels were significantly lower in all the groups compared to C, with exception of J₂₀ and HJ₈₀, and there were significantly higher LH levels in J₂₀, HJ₂₀ and HJ₈₀ compared to J₈₀. Serum FSH levels were significantly lower in H, J₂₀, J₈₀ compared to C, with exception of HJ₂₀ and HJ₈₀. However, there were no significant difference in HJ₂₀ and HJ₈₀ compared to C.

Conclusion: High intensity jumping exercise in combination with honey elicited beneficial effects on bone mass, bone strength level compared to low intensity exercise with or without honey supplementation and honey supplementation alone. Moreover, honey plays a protective role against adverse effects induced by jumping exercises on reproductive hormone secreted from anterior pituitary gland.

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OVARIETOMIZED DECREASE SERUM BONE TURNOVER MARKERS BUT NOT CHANGE THE RATIO OF BONE MINERAL ELEMENTS IN RATS

Z. Noor^{1,*}, B. Setiawan²

¹Orthopaedic, Ulin General Hospital Faculty of Medicine University of Lambung Mangkurat, Banjarmasin, ²Medical Chemistry and Biochemistry, Faculty of Medicine, Banjarbaru, Indonesia

Aims: This study was aimed to elucidate whether ovariectomized change the ratio of bone mineral element and serum bone turnover markers in rat.

Methods: A total of 30 Wistar male rats, were randomly divided into three groups including one control group and two groups for ovariectomized rats (1 and 2 months after ovariectomy). The ovariectomized procedure was done in Pharmacology Laboratory, Medical Faculty, Brawijaya University of Malang. The calcium/phosphorus ratio, copper/zinc ratio, calcium/iron ratio, calcium/nickel was analyzed using X-ray fluorescence in Central and Physics Laboratory, Malang State of University, Malang, East Java, Indonesia. The expression of osteocalcin and crosslinked telopeptidase was analyzed by ELISA in Biomedical Laboratory, Faculty of Medicine, University of Brawijaya, Malang. Nonparametric test was used to analyze the different level of bone mineral element ratio and serum bone turnover markers. This study was approved by Local Ethics Committee, Medical Faculty, Brawijaya University of Malang.

Results: There levels of calcium/phosphorus ratio, copper/zinc ratio, calcium/iron ratio, calcium/nickel were not significantly different between all groups ($p > 0.05$).

There expression of osteocalcin was lower significantly in ovariectomized rats compared to control group ($p < 0.05$). There expression of crosslinked telopeptidase was lower significantly in ovariectomized rats compared to control group ($p < 0.05$).

Conclusion: Ovariectomized decrease serum bone turnover markers but not change bone mineral elements in rats.

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MESOSTRUCTURE AND ATOMIC MINERAL COMPOSITION IN OSTEOPOROSIS

Z. Noor^{1,*}, M. Hidayat², A. H. Rahim³, S. B. Sumitro⁴

¹Orthopaedic, Ulin General Hospital Faculty of Medicine University of Lambung Mangkurat, Banjarmasin, ²Orthopaedic, Saiful Anwar General Hospital Faculty of Medicine University of Brawijaya, Malang, ³Orthopaedic, Hasan Sadikin General Hospital Faculty of Medicine University of Padjadjaran, Bandung, ⁴Biology, Faculty of Mathematic and Natural Sciences University of Brawijaya, Malang, Indonesia

Aims: To know the difference between mesostructure and atomic mineral composition on osteoporosis compared to normal bone.

Methods: Cross-sectional study was conducted at Ulin General Hospital, Faculty of Medicine, University of Lambung Mangkurat, Banjarmasin Syaiful Anwar General Hospital, Faculty of Medicine, University of Brawijaya, Malang, Indonesia. 25 osteoporosis patients and 18 normal patients had undergone surgery procedure involved in this study. Bone was obtained from surgery room then analyzed for mesostructure by scanning electron microscope (SEM) and atomic mineral composition by X-ray fluorescence (XRF) in Central and Physics Laboratory, Malang State of University, Malang, East Java, Indonesia. This study was approved by Local Ethics Committee, Medical Faculty, Brawijaya University of Malang.

Results: SEM result show degeneration of micro architecture (resorption cavity, holes, and high granule) in osteoporosis compared to normal bone. The level of iron (Fe), nickel (Ni), copper (Cu), ytterbium (Yb), chromium (Cr), molybdenum (Mo), and plumbum (Pb) were higher in osteoporosis bone compared to normal bone. The level of calcium (Ca), zinc (Zn), arsenic (As), silicon (Si), and titanium (Ti) were lower in osteoporosis compared to normal bone.

Conclusion: There is a difference of mesostructure between osteoporosis bone than normal that based on its character atomic mineral. The level of atomic mineral which change in osteoporosis compared to normal bone, is candidate for osteoporosis therapy.

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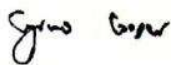
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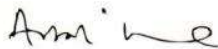
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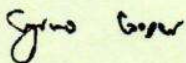
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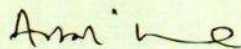
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MICROARCHITECTURE AND ATOMIC MINERAL COMPOSITION IN OSTEOPOROSIS



Zairin Noor¹, Mohammad Hidayat², Agus Hadian Rahim³, Sutiman B Sumitro⁴

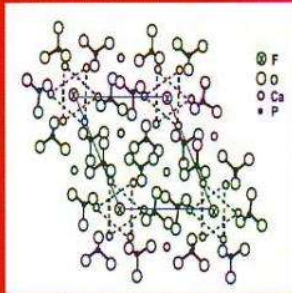
¹Department of Orthopaedic, Ulin General Hospital, Faculty of Medicine, University of Lambung Mangkurat, Banjarmasin, Indonesia

²Department of Orthopaedic, Syaiful Anwar General Hospital, Faculty of Medicine, University of Brawijaya, Malang, Indonesia

³Department of Orthopaedic, Hasan Sadikin Hospital, Faculty of Medicine, University of Padjadjaran, Bandung, Indonesia

⁴Department of Biology, Faculty of Mathematic and Natural Science, University of Brawijaya, Malang, Indonesia

INTRODUCTION



Material configuration followed Mandelbroth fractal set pattern

OBJECTIVES

- Aim of this study was to know the difference between mesostructure and atomic mineral composition on osteoporosis compared to normal bone.

METHODS

- Cross sectional study was conducted at Ulin General Hospital, Faculty of Medicine, University of Lambung Mangkurat, Banjarmasin Syaiful Anwar General Hospital, Faculty of Medicine, University of Brawijaya, Malang, Indonesia.
- Bone was obtained from surgery room then analyzed for mesostructure by Scanning Electron Microscope (SEM) and atomic mineral composition by X-Ray Fluorescence (XRF) in Central and Physics Laboratory, Malang State of University, Malang, East Java, Indonesia.

RESULTS

Osteoporosis



Excessive resorption, trabecular thinning, and hole formation

Normal



Trabecular compactness, connected arcus, well integrity

RESULTS

Osteoporosis



Granule in variation of height

Normal

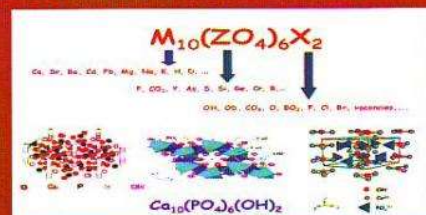


Continuous structure like stepladder

- The level of iron (Fe), nickel (Ni), copper (Cu), ytterbium (Yb), chromium (Cr), molybdenum (Mo), and plumbum (Pb) were higher in osteoporosis bone compared to normal bone.
- The level of calcium (Ca), zinc (Zn), arsenic (As), silicon (Si), and titanium (Ti) were lower in osteoporosis compared to normal bone.

DISCUSSION

- Microstructure osteoporosis trabecular bone is different than normal bone.
- Changes such as thinning, tapering, breakage, and perforation made the arch structure lose its integrity.
- Some of them became round due to continuous resorption to obtain knob-like structure.
- These changes contributed to an obviously increasing separation of inter-trabeculae.



Substitution or incorporation atomic mineral (Vallet-Regi & Arcos, 2008)

CONCLUSION

- There is a difference of mesostructure between osteoporosis bone than normal that based on its character atomic mineral.
- The level of atomic mineral which change in osteoporosis compared to normal bone, is candidate for osteoporosis therapy.

Presented at The 3rd Asia - Pasific Osteoporosis Meeting
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