Doctoral Thesis

Effects of Long-Term Different Physical Exercises on Volumetric Bone Mineral Density, Bone Geometric Properties and Strength Index: A pQCT Study

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CONTENTS

LIST OF PAPERS

The present thesis is based on the following papers:

1. Nara-Ashizawa N, **Liu LJ**, Higuchi T, Tokuyama K, Hayashi K, Shirasaki Y, Amagai H and Saitoh S. Paradoxical adaptation of mature radius to unilateral use in tennis playing. Bone 30: 619-623, 2002.
2. **Liu LJ**, Maruno R, Mashimo T, Sanka K, Higuchi T, Hayashi K, Shirasaki Y, Mukai N, Saitoh S and Tokuyama K. Effects of physical training on cortical bone at the mid-tibia assessed by pQCT. J Appl Physiol 95: 219-224, 2003.
3. Takano J, Fujii N, Mukai N, **Liu LJ**, Hayashi K, Shirasaki Y, Saitoh S and Tokuyama K. Jumper's tibia assessed along 64 directions centering center of gravity of the bone by pQCT. Jpn J Phys Fitness Sports Med 53: 123-130, 2004 (in Japanese).
4. **Liu LJ**, Tokuyama K. If exercise does not increase bone mineral density, what does it change? Jpn J Phys Fitness Sports Med (in press, 2005).

ABBREVIATIONS

aBMD	Areal bone mineral density
ANOCOVA	Analysis of covariance
ANOVA	Analysis of variance
BMC	Bone mineral content
BMD	Bone mineral density
BVF	Bone volume fraction
CT	Computed tomography
DPA	Dual-photon absorptiometry
DXA	Dual-energy X-ray absorptiometry
MRI	Magnetic resonance imaging
NIH	National institutes of health
PMI	Polar moment of inertia
pQCT	Peripheral quantitative computed tomography
QUS	Quantitative ultrasound
QMRI	Quantitative magnetic resonance imaging
SD	Standard deviation
SM	Section modulus
SPA	Single-photon absorptiometry
SSI	Strength strain index
vBMD	Volumetric bone mineral density