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PL01 Treatment of Osteoporotic fracture

Kerong Dai (China)

PL02 Diagnostic Tools for Osteoporosis and Fracture Prediction in Asian Populations

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Fractures occur because of skeletal fragility and increased risk of falls. The World Health Organization (WHO) has defined a number of threshold values for osteoporosis. These reference values are derived from bone mineral density (BMD) measurements in a population of healthy young adults. Osteoporosis is diagnosed when the BMD is more than 2.5 standard deviation below the young adult mean. This threshold is chosen because it identifies the same percentage of women with increased life time risk of fracture. This threshold is used for assessing the fracture risk of the subject and should not be used as threshold for initiation of treatment, as the large majority of patients fractured at BMD above this threshold.

The Osteoporosis Assessment Tool for Asians (OSTA), which is generated from data from 10 Asian countries and utilized age and weight to predict low BMD, is a simple tool to identify patients for future bone density evaluation. Apart from low BMD, a number of clinical risk factors have been identified for osteoporotic fracture. Most of these risk factors can be identified from a simply questionnaire, which could be useful as a first screen. Subjects with a combination of clinical risk factors have higher risks of fracture than having a low BMD alone. However, incorporation of BMD only slightly enhanced the predictive power of clinical risk factors. Based on these findings, WHO propose that in regions with limited access to BMD measurement, initiation of anti-osteoporosis therapy should be considered if the fracture risk is considerable based on evaluation of clinical risk factors. To assist in patient assessment the WHO FRAX assessment tool, available online, utilizes risk factors including BMD (if available), low BMI, past fracture, a parental history of hip fracture, prior glucocorticoid usage, current smoking, increasing age, rheumatoid arthritis and alcohol consumption to assess 10 year fracture probability. However the tool does not as yet define an intervention threshold and some other risk factors which increase fracture rates at not included. Clinical risk factors and their risk profile with fractures may also vary in different populations. Other approach utilizes the cost-effective analysis which incorporates the cost and health consequences of clinical fractures of osteoporotic origin to

identify the 10 year hip fracture probability. In developed countries such as USA, it was concluded that a 3% 10 year risk of hip fracture was generally required for osteoporosis treatment to cost less than USD60,000 per QALY gained. It is obvious that the economics of such a model may definitely not be applicable to less wealth countries and other strategies may need to be developed.

PL03 Recent trend of fragility fracture in Japan

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With the rapid increase in the elderly population, fragility fractures are major health and socioeconomic issues in Asian countries. Previous epidemiological studies concluded that the incidence rates of hip fractures for Asian people including Japanese are lower than those for Caucasians living in North Europe and North America. Dividing into fracture type, neck/ trochanteric ratio has been increasing recently in Japan. Lifetime risks of hip fracture for 50-year-old men and women in the population were 5.6% for men and 20.0% for women estimated by simple approximation using the incidence data and life tables for the Japanese population in 2006. Concerning the incidence of upper limb fractures for Japanese, there is a few data available, which indicate that those for forearm and proximal humerus fractures are lower than those for Caucasians. About 10 to 20% of elderly people living at their own homes in Japan fall during a year, while 30 to 40% fall in Northern Europe and North America. The fact that the prevalence of falls among Japanese is half that of Caucasians offers a possible explanation for the difference in incidence of these fractures. On the other hand, the prevalence as well as the incidence for vertebral fractures is higher among Japanese than those reported in Europe.

Recent survey revealed that the age- and gender-specific incidence of hip fracture in Tottori Prefecture, Japan has not plateaued for either gender. Epidemiological surveys in Europe before 1990 showed that the incidence of hip fractures was increasing; however, data from the 1990s or later from Northern Europe or North America indicated that the increase had leveled off. The reason for the discrepancies in recent trends between races has not been well elucidated, though changes in lifestyle in Asian countries seem to affect the trend.

It is estimated that the number of hip fractures are expected to be 180,000 in 2010 annually and exceed 300,000 in 2030, and that of vertebral fractures are expected to be 1,400,000 in 2010 and 1,800,000 in 2030, even assuming no increase in age- and sex-specific incidence rates. Fracture preventive strategies including prevention and treatment of osteoporosis and prevention of falling, and maintenance of physical activities among the elderly by changing lifestyle is important in order to

reduce the social burden in the future.

PL04 Increasing incidence of hip fracture in Chiang Mai, Thailand

Prasit WONGTRIRATANACHAI (Thailand)

PL05 How to Improve the Osteoporotic Diagnosis ---The ISCD Course in Taiwan

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Osteoporosis is widely recognized as an important public health problem in Worldwide and Taiwan. Bone density measurements have an important clinical role in the evaluation of patients at risk of osteoporosis and ensuring the appropriate use of anti-fracture treatment. In response to the need to qualify new practitioners' commitment to quality and to establish minimum (entry level) performance standards, the International Society of Clinical Densitometry (ISCD) launched the Professional Certification program in early 1996 and periodically reviewed the Official Position Statement. The ISCD Certification body of knowledge covers the principles and concepts of bone density testing, diagnosis and treatment of osteoporosis and metabolic bone disease.

In order to advance the excellence in the assessment of skeletal health, the Taiwanese Osteoporosis Association (TOA) signed the agreement with ISCD and held the first Certification Course and Examination in Taiwan in June, 2002. Two certifications: Certified Clinical Densitometrist (CCD) and Certified Densitometry Technologist (CDT) are offered. Until this July, there were 13 Certification Course and Examinations (one English and 12 Chinese delivered by 5 full faculties and 6 guest faculties) held by the TOA across the Taiwan. Of the 1,333 attendee, 817 attended the CCD and 516 attended the CDT course. The syllabus was English version, but the examination materials had been translated to Chinese version for Technologist course. The mean average pass rate was 68.6% (73.3% for clinician and 61.2% for technologist). Nearly all the attendee rated the ISCD course as a useful program in upgrading the personal competence in DXA interpretation. Those who passed the examination are listed on the website of TOA (www.toa1997.org.tw)

ISCD currently have co-membership agreements with Taiwan, China and Korea, the countries from Asia Pacific regions. However, nearly all of the ISCD position statement was focused on the Caucasians. Could the ISCD position be applicable to the AP regions? Under the full support of TOA and ISCD, we successfully hosted the first Asia-Pacific Consensus of ISCD Position Statement in 25-26th July, 2009 in Taipei. This AP consensus was under reviewed by ISCD and hopefully to be published in the JCD soon after. The whole program was recorded and posted on the website of TOA (www.toa1997.org.tw).

In conclusion, the certificate of ISCD course reflects a personal commitment, accountability and dedication to a high standard of care for patients, peers and the community at large. For the public health, it helps in identifying qualified service providers. We believe those changes will positively improve the proper diagnosis and early intervention in osteoporosis in Taiwan.

PL06 Ideal Position of Hip Lag Screw Within the Femoral Head of Osteoporotic Hip Fractures : Based on Micro-CT Analysis of the Trabecular Bone tructure

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Purpose : Knowledge of the femoral head structure can provide useful information on the proper placement of orthopaedic implants for the fixation of hip fractures, such as hip lag screw and multiple hip cannulated screws, as well as for providing baseline data for osteoporosis studies related to regional bone loss. Although a previous cadaveric study revealed the bone mineral density (BMD) of 5 portions of the femoral head, the BMD is not the sole determinant of the bone strength and current BMD measurements provide a regionally averaged value that does not show regional heterogeneity. Micro-architectural analysis can be more reliable than BMD and provide more detailed information on the bone strength allowing regional differences in the trabecular bone.

Methods : Twenty femora extracted from 10 embalmed cadavers were examined to establish the baseline characteristics of an anatomically divided femoral head using microCT, and to consider the optimal position of a hip lag screw based on the results. Each head was cut into each 9 segment (9mm x 9mm x 20mm): in both the anteroposterior (superior, center, inferior) and lateral views (anterior, center, posterior). Each of 9 segment was scanned by microCT. Six microstructural parameters were acquired (BV [bone volume] /TV [total volume], Tb.Th. [trabecular thickness], Tb.No. [trabecular number], Tb.Sp. [trabecular separation], SMI [structure model index], and DOA [degree of anisotropy]).

Results : The results showed that the center-center segment has the strongest trabecular bone. The inferior-center position may be better than the center-center position for preventing hip screw cutout of hip nail devices with an anti-rotation system because the hip screw can be buttressed by the strongest center-center bone segment.

Conclusions : This study is the first attempt to establish the baseline characteristics of the microstructure of an evenly divided femoral head using microCT with particular focus on the optimal position of a hip lag screw within the femoral head (center-center vs inferior-center positions).

PL07 The role of bone turnover markers in clinical practice for osteoporosis

Lee Joon Kiong (Malaysia)

PL08 Calcium supplements increase vascular events?

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Calcium supplementation has long been regarded as a key component of osteoporosis management but the evidence base is poor. It is now clearly established that calcium substantially slows bone loss in postmenopausal women over 5 years, and in men over shorter periods. Effects on fracture risk remain unclear, and there is some evidence that calcium monotherapy actually increases the risk of hip fracture. Low levels of long-term compliance with calcium, which are probably attributable to the bulkiness of calcium supplements and to the GI side-effects which they cause, may be the cause of poor anti-fracture efficacy. Other benefits and risks from use of calcium have been postulated. There is some evidence that calcium supplements improve blood cholesterol profiles and that they have small beneficial effects on blood pressure. However, there is no convincing evidence that this translates into decreased cardiovascular risk, and there is accumulating evidence that the opposite is the case. Because of the substantial morbidity and mortality that flow from cardiovascular disease, this is a critical factor in determining the value of calcium supplementation. In conclusion, there is not yet broad consensus as to the net benefit from the use of calcium supplements. Until it is more firmly established that there is a positive benefit:risk ratio then calcium supplementation should be used sparingly and a greater emphasis should be placed on high dietary calcium intakes and the use of pharmaceuticals with proven anti-fracture efficacy.

PL09 Vitamin D and Osteoporosis

Leilani Mercado-asis （Philippines）

PL10 Male Osteoporosis -More than meets the eye

Manju Chandran (Singapore)

PL11 Management of Osteoporosis Future Directions

Steven Cummings (USA)

PL12 The Risk of Refracture Associated With the Compliance with Bisphosphonates Therapy in Taiwan

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Background Bisphosphonates have been used for the treatment of postmenopausal osteoporosis since the early 1990s, they are potent inhibitors of osteoclast activity that reduce bone turnover and re-establish the balance between bone resorption and formation. Patients who were compliant with their osteoporosis medication, including bisphosphonates, estrogens and calcitonin, experienced a lower fracture rate compared to non-compliant users. In Taiwan reimbursed guideline,patients experienced osteoporosis-related fractures were eligible for bisphosphonates treatment. The objective of this study was to investigate the risk of refracture associated with the compliance with bisphosphonates therapy

Objectives To elucidate the relation of the risk of refractures to compliance with bisphosphonates therapy in Taiwan

Methods The data used for this study were obtained from the National Health Insurance Research Database (NHIRD) of Taiwan. The data included all records of hospitalizations, physician services, and medication prescriptions dispensed between 1 January 2003 and 31 December 2006. The study cohort included all new users of bisphosphonates. Compliance was calculated using the Medication Possession Ratio (MPR). MPR was defined as the sum of days supply of osteoporosis medications dispensing during osteoporosis medication therapy.

Results and conclusion The refracture rates of these osteoporosis patients are increasing with time. The refracture rate is 5.15%, 7.36% and 8.49% at the 1^{s}, 2^{nd} and 3^{rd} year. And the refracture rate of patients with over 80% compliance is significant lower than whom compliance below 80% ($p<0.05$).

The study reported that near half of the patients were noncompliant with therapy (MPR<80%) at as early as 3 month and only near 30% of the patients are adherent at 1 year. And the result also shows that the risk of refracture is increasing for that patients with MPR<80%, older patients or patients with comobility such as diabetes mellitus or dementia. From the study, the compliance of Taiwan patients is poor. And the study demonstrated that the risk of refracture is associated with the compliance with bisphosphonates therapy in Taiwan . The compliance issue for osteoporosis treatment should be paid much more attention.

Keywords: Osteoporosis, Bisphophnate therapy , Medication possession ratio (MPR), Compliance, Refracture

PL13 Absolute Fracture Risk-How to use FRAX in different area?（or WHO 2008 Fracture Risk: Clinical Concerns and Controversies）

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PL14 CYP3A4*18 genotype in cytochrome P450 3A4 gene, a rapid metabolizer of sex steroids, is associated with low bone mineral density.

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Cytochrome P450 (CYP) 3A is generally considered the most important of the CYP because of its abundance and prominent role in metabolism. The CYP3As account for approximately 30% of the total CYP enzymes expressed in adult liver. CYP3A enzyme is known to metabolize a large variety of xenobiotics and endogenous substrates, including sex steroids. There are at least three isoforms, including CYP3A4, CYP3A5, and CYP3A7. CYP3A7 is the predominant variant occurring prenatally; CYP3A4 is the most abundant enzyme in adult liver, whereas CYP3A5 ranges from undetectable to up to more than 50 % of whole CYP3A liver enzyme depending on a polymorphism in the CYP3A5 gene.

An important characteristics of the CYP3A subfamily is the marked intraindividual and interindividual variability in metabolizing activity, with observations of 10- to 100-fold variation in the liver. It has been suggested that genetic variability will account for up to 90% of the interindivudual differences in CYP3A activity.

Osteoporosis is a disease that is strongly influenced by genetic factors. Low bone mass and high bone turnover are highly related to sex hormones. The inter-individual variability in the catalytic activity of CYP3A may result from genetic polymorphisms and influence the risk of osteoporosis.

Our group has screened blood DNA from 225 unrelated Koreans for sequence variations in all 13 exons of CYP3A4 gene and identified only one missense mutation, CYP3A4*18 (L293P). In 2,178 unrelated women, the subjects with CYP3A4*18 genotype were significantly associated with low bone mass. *In vitro* functional analyses indicate that CYP3A4*18 is a gain-of-function mutation in the metabolism of sex steroids, resulting in rapid oxidation of estrogens and testosterone. *In vivo* pharmacokinetics using midazolam as a phenotyping probe represent the modulating effect in the catalytic activity of the CYP3A4*18 variant. Molecular modeling reveals the mutational effect of CYP3A4*18 results in the structural changes of the substrate recognition sites that can lead to change in enzymatic activity.

CYP3A4*18 has been identified only in some Asian populations, including Japanese and Chinese, but not in Caucasians or African Americans. The genotype-specific differences in BMD were shown first in our study involving the CYP3A4*18 protein. Although pharmacogenetic approaches to drug response and the possibility to use genetic screenings for a personalized-tailored medicine have limited applications, our study suggests that genetic markers in estrogen metabolism could be clinically useful for identifying subjects at risk for osteoporosis and also for screening drug responsiveness or adverse effects before hormone therapy.

PL15 Standardization of QUS in Japan

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An ultrasound bone density measurement (QUS : Quantitative Ultrasound) is widely used in Japan. The QUS is well used also as screening of osteoporosis for medical check up in public health or diagnosis of osteoporosis in general physician because of its simple and non-invasive method which does not use X-rays. About 7000 QUS equipments are working in whole Japan, which are more than DXA equipments, and it is a country having QUS most in the world. In the epidemiologic survey of EPIDOS study or many, it were reported that there were good correlation between the hip fracture and QUS values .It is thought that QUS becomes a useful tool for diagnosing osteoporosis .

There are two kind of parameters in QUS measurement. One is a primary parameter which contains SOS and BUA , another like Stiffness etc. are secondary parameters which calculate from primary parameters .All of those parameters have not stantardized yet .

In Japan, the QUS standardization committee by a Japanese osteoporosis society was made from 2007, and standardization work was started. As opposed to 6 QUS machines (AOS100, CM200,

A1000express, UBIS5000, Benus, Minelyzer) for which we are mainly used in Japan now , measurement accuracy in vitro and correlation between each equipment in vivo were investigated . We measured simultaneously with all equipments for 281-person (142 men, 139 women) and the standardization was investigated.

In every equipment, %CV were 0.3% or less, and since measured value had a fixed tendency by the algorithm of an instrument, we decided that it was able to calculate standardized SOS (second-SOS) with most suitable correlation from each measurement. A conversion formula are shown.

AOS100 s-SOS=1.18xSOS -307.95
CM200 s-SOS=0.86xSOS+220.24
A1000 s-SOS=0.79xSOS+298.00
UBIS5000 s-SOS=1.03xSOS+3.64
new Benus s-SOS=1.40xSOS+636.67
Minelizer s-SOS=2.00xSOS-1504.70

Using those s-SOS conversion formula , we have re-analyzed the conventional reference data and fracture threshold data .Since 20 years-old cost fell [man and woman] gradually at a peak, we used the data of the man and woman of 20-29years-old as YAM .The female YAM value in s-SOS was 1550.3±27.9 m/s, and the male was 1548.0±30.2 m/s. The fracture threshold was 1496.8 m/s (male-1.61, female-1.93 in T score).

The s-SOS as standardized QUS becomes easy to compare with internationally from now on. To ask for more nearly universal standardization, a standard phantom needs to be created, but at present, there is still no such phantom in the world. The committee of a Japanese osteoporosis society is consider to create the standard phantom . The project has been started now .

In Asia, the fracture by osteoporosis will be the biggest social problem from now on. Cheaper and safe bone density measurement is expected and QUS becomes one choice. Especially standardized QUS is most needed when examining the osteoporosis of Asia.

PL16 Age related changes and ethnic difference in femoral geometry

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Osteoporosis represents a major endocrine health problem, and its consequence of fragility fractures are leading cause of morbidity, mortality and high health coats. Although, DXA has been most widely used for assessing bone density and predicting the probability of osteoporotic fracture, considerable fractures occur in those whose areal BMD is actually above the osteoporosis threshold. It would

seem that bone strength affects from not only bone mineral density which could captured by DXA, but also femoral geometry could not capture well by DXA. Recent studies have found associations between structural properties and hip fracture. Although these results are controversial and not known yet which factor of geometric properties is most important for bone strength, all these studies showed that bone strengths have strong association with bone geometric properties. The incidence of hip fracture is rapidly increased with aging, and this notable increase of fracture incidence with aging is related to decrease of bone mass. However, bone structural changes with aging seem to be also important causative factor of fragility in elderly. Therefore, it is important to appreciate rightly underlying changes in bone structural geometry for prevention of fracture. Antiresorptive agents reduce the rate of bone turnover and increase BMD as s results, and these agents have been approved for the treatment of osteoporosis and prevention of fragility fracture. However, changes of BMD with using these agents is very small compared to great risk reduction of fracture incidence. Antifracture efficacy of antiresorptive agent could not be fully explained only by increased BMD. This great reduction in fracture implies an improvement in bone structural changes which could be affect to bone strength. Previous reports described that Asian have lower BMD than Caucasians, although hip fracture rates are generally lower in Asian. Considering the relationship between bone strength and structural properties, it goes without saying that differences in femoral geometry between ethnic groups might to contribute to this contradictory phenomenon. For investigation of age related changes in femoral geometry and effects of antiresorptive agent on those, we analyzed hip structural properties of 571 postmenopausal women with QCT scan. Cortical thinning and trabecular volumetric BMD loss of femur neck was most prominent changes with aging, and antiresorptive agent showed preventive effect on these changes. Moreover, comparing with other ethnic groups, Korean had narrower neck width and smaller femur cross sectional area negatively correlated with bone strength, but had thicker cortice positively correlated with bone.

PL17 Phytotherapy in Osteoporosis

Hanmin Zhu (China)

PL18 Long-term mortality after osteoporotic fracture in Chiang Mai, Thailand

Sirichai LUEVITOONVECHKIJ (Thailand)

PL19 Multidisciplinary Treatment of Geriatric Fracture Patients: Co-managed care

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Osteoporotic fractures in older adults constitute a significant and increasing burden of illness in the community. The majority of this burden is due to lower limb fractures, half of which occur in the proximal femur. These carry a one year mortality of up to 30% . One year after hip fracture, 40% of patients are still unable to walk independently, 60% have difficulty with at least one essential activity of daily living, and 80% are restricted in other activities, such as driving and grocery shopping. Moreover, 27% of these patients enter a nursing home for the first time. It is important to not only stabilize the fracture, but to consider the geriatric fracture patient's overall health. This can reduce complications and minimize future fractures and improve the outcome.

In the past, treatment of the acute fracture was the sole focus of their practice. There are increasing responsibilities to address when caring for geriatric fracture patients, such as the diagnosis and treatment of osteoporosis. Evaluation of fall risk is another component of future fracture prevention. In general, orthopaedic surgeons cannot accept sole responsibility for all these very complex problems. A multidisciplinary co-managed care approach for the elderly fracture patient has been adopted in some centers with good success.

It is important to recognize that geriatric fracture patients constitute an extremely heterogeneous population. There are significant variations in health status between patients admitted to the hospital and in their functional needs and demands. The most complex problem of geriatric fracture patients are the pre-existing comorbid conditions and related medications. At the time of hospital admission for an acute fracture, it is very likely these patients already suffer from 2 or more relevant comorbidities and are on six or more drugs. To address this situation, an individual assessment is required upon hospital admission and individualized therapy programs planned. This assessment must be completed as soon as possible to allow the patient's condition to be rapidly optimized for surgery. This assessment includes a medication list and check for possible drug - drug interactions. These problems must be addressed preoperatively to prevent postoperative complications.

PL20 What is new in menopause

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Recognition that the changing population demographic called for a greater emphasis on midlife women. For a longtime, menopause has been in the shadows of myth and superstition, particularly in this Asian part of the world. But due to all concerned our efforts, this important segment of a woman's life not only reached full recognition by international health organizations and health care providers but also its implication on woman's health and its medical management became one of the fastest growing sub-discipline within Gynecology.

Not only in Thailand, but also in other Asian countries, the population aged over 60 year and older is increasing. The impact of the aging females is now more clearly understood but also more detectable, especially in the healthcare professionals within developed and developing countries has shifted from the prevention of early death due to infectious diseases to the management and prevention of age-dependent, chronic diseases. These shifts mirror the changes of worldwide demographics, that in the future physicians will spend more time caring for the aging both female and male.

Asian Perspective or Menopause

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Interest in menopause seemed to pick up momentum in Asia after the 6th International Congress on the Menopause held in Bangkok in 1990 by the International Menopause Society. The Congress was well attended by over 1200 participants and more than half of them were from Asia countries. With requests from some member states, from Asia the WHO Special Programme of Research, Development and Research Training in Human Reproduction, Geneva, 1994, called for a meeting of experts to review current knowledge on menopause and issue guidelines for research and the management of menopause. In May, 1997, another meeting was convened by the Special Programme to specifically review menopausal problems in Asia and to call for a consensus to the

approach to menopause in the Asia context. From the latter meeting, it is quite evident that Asian Perspectives to menopause need to be formulated and developed in a holistic fashion through research, based on cultural, economic and ethnic attributes, changing lifestyles and native morbidity such as the prevalence of menopausal consequences and HIV. The strategy toward the management of menopause may vary from country to country according to socio-economic and cultural conditions.

Perceiving menopause as a disease and managing menopause by using HRT raises some questions.

- Whilst some of its benefits are clear, what are the long-term effects of current regimens—in particular, the risk of cancer, which is of intense concern to women?
- Particular groups who should be targeted for this therapy have not yet been adequately identified. Should hormones be used only in the treatment of pathological conditions?
- Is it reasonable to use them for cosmetic or life style reasons, for example, to prevent skin wrinkle, or to preserve sexual attractiveness?
- Who should decide: the women themselves, their spouses, doctor, the government?

APMF Consensus Guidelines: Implications for Clinical Practice

The Asia-Pacific Menopause Federation (APMF) has 14 member national societies from across the Asia-Pacific region. The APMF Consensus Statement represents the combined opinion of representatives from the member countries and is intended to aid gynaecologists, family physicians and other health-care professionals in providing optimal care to menopausal women in the region.

The prevalences of menopausal symptoms vary between Asia-Pacific countries and are different to those usually reported in predominantly Caucasian populations. Whilst, vasomotor symptoms are less frequent and intense in Asian women, somatic symptoms (e.g. muscle and joint pain, dizziness, irritability and insomnia) appear to be more common than in predominantly Caucasian populations.

The key recommendations of the consensus are:

Decision-making regarding the menopause

All women should be given the opportunity to participate in their menopause management decision-making process, including the use of hormone replacement therapy (HRT). Before commencing HRT, a woman's healthcare provider should inform her about the risks and benefits of therapy, its potential generally side effects, and side-effects that specifically apply to her situation. This advice should be repeated at each of her regular follow-up visits during therapy. Use of HRT should be individualized and treatment goals should take into account symptoms that may impact quality of life, for example, decreased sexual function and insomnia (Table 1).

Table 1. Recommended Initial Assessment for peri- or postmenopausal women

Examination	Investigations	Other Investigations
Genera, including:	**Advised**	**to be ordered on a case to case basis could include**
Weight & height	Pap smear	
Blood pressure	Complete blood count	Liver function
Breast	Fasting blood sugar	Thyroid function
Pelvic	Fasting Lipid profile	Mammography
		Bone mineral density
		Ultrasonography

HRT – indications and recommendations

Dietary and lifestyle modification should be promoted as first-line prevention and treatment, following which, HRT is recommended as the primary and most important option to alleviate menopausal symptoms such as vasomotor symptoms and associated sleep disturbances and urogenital complaints. When hormone are considered only for treating vulvovaginal symptoms the use of topical vaginal products should the priority. HRT also remains an option for preventing osteoporosis. When prescribed solely for osteoporosis prevention, HRT should be considered along with non-oestrogen medications for women at significant risk of osteoporosis. By decreasing menopausal symptoms, HRT may improve overall health-related quality of life.

The lowest effective dose of HRT consistent with treatment goals should be used. From available evidence, there is no reason to place mandatory limits on the treatment duration; HRT should be given for as long as its benefits outweigh the risks and benefits should be periodically assessed. Notably, the greatest benefit of HRT occurs when it is initiated during menopausal transition or in the early menopause.

Women who wish to avoid HRT, or in whom HRT is contraindicated, may choose therapies other than hormonal preparations to relieve their menopausal symptoms. These include SSRIs, SNRIs, clonidine, gabapentin, complementary and alternative medicines. The degree of symptom relief however, is less than that attained with HRT and there may be side-effects. Long-term safety and efficacy data are also lacking. Women choosing to use complementary and alternative medicines to relieve menopausal symptoms should be made aware that they have lower efficacy than HRT and that quality control is questionable.

Low dose HRT is especially appropriate for Asian women, who in general have a low incidence and severity of vasomotor symptoms. Moreover, some somatic symptoms commonly experienced by postmenopausal women in the Asia-Pacific region, respond to treatment with low dose HRT.

PL21 Cost effective management of Osteoporosis

Lau Tang Ching (Singapore)

・Meet experts

ME-1 The relationship between fat and bone

Sang Mo hong (Korea)

ME-2 Clinical Pearls in Bone Densitometry

Chionh Siok Bee (Singapore)

ME-3 Strategy on Treatment of osteoporotic fracture

Gongyi Huang (China)

ME-4 Rheumatology

Fengchun Zhang（China）

ME-5 Bisphosphonates – Controversies on Long-Term Usage

Tai-Pang IP

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Bisphosphonates (BPPs) with alendronate being the first of its class were approved for the treatment of postmenopausal osteoporosis by the FDA, United States in 1995. With their potent antiresorptive properties, BPPs have been proven to be very effective in decreasing the risk of osteoporotic fractures. A report published in 2004 on the10-year experience on the use of alendronate had confirmed the long-term safety and efficacy of alendronate so that BPPs had mostly been regarded as the first line agent in the treatment of postmenopausal osteoporosis. With its widespread clinical use, isolated cases of BPP-related osteonecrosis of the jaw (BRONJ) and atypical fractures had been reported in the past several years. Clinicians started to cast worries on the potential adverse effects on bone quality associated with prolonged anti-resorption by BPPs.

ONJ is defined as an area of exposed bone in the maxillofacial region that does not heal within 6-weeks after a dental procedure after exclusion of malignancy at the site of the lesion and osteoradionecrosis. BRONJ was first recognized in 2003 to be associated with intravenous zoledronic acid or pamidronate treatment for malignancy and Paget's disease of the bone. Subsequently it had also been reported with oral BPP for treatment of postmenopausal osteoporosis.

While the incidence of ONJ in the general population was not known, post-marketing data showed that the incidence of ONJ was around 0.7 case per 100,000 person-years of exposure to BPPs. The risk in patients with malignancy were much greater with an estimated frequency of 1 in 87-114. Besides malignancy, other risk factors identified were smoking and alcohol abuse, poor oral hygiene, diabetes and the use of corticosteroid. Current evidence had not established a direct causal relationship of ONJ with BPPs.

In recent years, anecdotal reports of atypical fracture (at the subtrochanteric or femoral shaft) were noted in osteoporosis patients taking long-term BPPs usually for at least 5-y duration. The fractures often bilateral occurred after minimal or no trauma at any sites in the femur between the lesser trochanter and the metaphyseal plate and were often preceded by prodromal pain at the thigh weeks or months prior to complete fracture. The femoral shafts are typically noted to have bilateral cortical thickening with medial buckling. They usually have very low levels of the biochemical markers of bone turnover raising the suspicion of over-suppression of bone remodeling by the BPPs. However a direct causal-effect relationship of atypical fracture with BPPs have again not been established.

In conclusion, in balancing the documented anti-fracture efficacy of BPPs and the rarity of the occurrence of BRONJ and atypical fractures, the benefits of BPPs should outweigh the very low potential adverse effects of BRONJ and atypical fractures but clinicians should be on the look out for these uncommon adverse effects.

ME-6 Renal Bone Disease

ManjuChandran (Singapore)

ME-7 Primary hyperparathyroidism

Xunwu Meng(China)

ME-8 Clinical issue on bone measurement in China

Wei Yu（China）

• **Oral communication**

E*01* Factors Influencing Diagnosis and Treatment of Osteoporosis after Fragility Fractures among Women in 7 Asian Countries

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Objectives To characterize the clinical and demographic characteristics that affects the likelihood of osteoporosis diagnosis and pharmacologic treatments among post-menopausal women after hospitalizations due to fragility fractures in Asia.

Methods From February 2008 to June 2009,1,148 eligible patients hospitalized due to fragility fractures were enrolled from 7 countries including Hong Kong, Thailand, South Korea, China, Singapore, Malaysia and Taiwan. Participating patients were randomly selected from hospital discharge records of participating medical centers. Medical history, treatment and supplement intake data were collected by face-to-face and telephone interviews and medical chart reviews. Chi-square tests and logistic regression models were applied built to identify significant factors associated with osteoporosis diagnosis and treatment offered.

Results 1,122 eligible female patients of mean age 72.9 years who had fragility fractures during July 1st, 2006 to June 30th, 2007 were included in the analysis. Only 51.5% (range 28.9 to 84.2%) of all patients reported being diagnosed having osteoporosis, with 37.9% of the diagnosis being made prior to the index fracture. 43.4% were diagnosed by orthopedists and only 4.0% by primary care physicians. In the multivariable analyses, having a BMD measurement was significantly associated with osteoporosis diagnosis (OR=10.1, 95% CI=6.38, 16.1), while a fracture history was not. Among the 576 patients who were diagnosed as having osteoporosis, only 8.1% received osteoporosis medications, 26.5% received supplementations of vitamin D or multi-vitamin or calcium, 24.9%

treated with both medications and supplements, and 40.5% of them did not receive any medication. None of the patients under 50 years were treated with osteoporosis medication. Patients who received a BMD measurement were twice more likely to be treated with osteoporosis medications (chi-square test, P<0.01). In the multivariable model, patients aged 65-79 years were significantly more likely to receive osteoporosis medications than patients in other age groups. Furthermore, patients who relied completely on social insurance for health care had 82% less chance of receiving osteoporosis medications than those who self-financed their drugs.

Conclusion In Asian countries, osteoporosis diagnosis and treatment decisions for women after fragility fractures were largely driven by BMD measurements and not by a history of prior fracture while majority of these patients were not treated for osteoporosis. Majority of the diagnoses were made by orthopedic specialists. Future efforts should be made to emphasize the education of general physicians and the importance of fracture history in osteoporosis care.

E*02* Sodium/myo-inositol Cotransporter 1 and Myo-inositol Are Essential for Osteogenesis and Bone Formation

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the University of Hong Kong[1], Nanjing Medical University[2]

INTRODUCTION Osteoporosis is a major public health problem and identification of the mechanisms modulating bone formation is essential to understand its cause. Myo-inositol (MI), a crucial constituent and essential nutrient for living cells, plays an important role in cell signaling and osmoregulation. Sodium/MI cotransporter 1 (SMIT1) is the major cotransporter of MI. Using a knockout mice model, we have characterized the essential roles of SMIT1 and MI in bone metabolism.

OBJECTIVES To define the role of SMIT1 and MI in osteogenesis and bone formation using cell models and SMIT1$^{-/-}$ mice and to determine the reversibility of the abnormalities with MI supplementation.

RESULTS SMIT1 is expressed in multipotential progenitor C3H10T1/2 cells and preosteoblastic MC3E3-T1 cells, and its expression was enhanced during BMP2-induced osteoblastogenesis. The homozygous SMIT1 knockout (SMIT1$^{-/-}$) embryos died soon after birth due to respiratory failure and had abnormal bone phenotypes with a dramatic delay in prenatal mineralization. These abnormalities could be completely rescued by prenatal maternal MI supplementation. On the other hand, the rescued SMIT1$^{-/-}$ mice still had short limbs, decreased bone density and abnormal bone architecture in adulthood. Bone matrix proteins including biglycan, type I collagen and osteocalcin were

decreased in bone sections from SMIT1$^{-/-}$ mice. Primary mesenchymal stem cells (MSCs) and osteoblasts isolated from SMIT1$^{-/-}$ mice had greatly reduced intracellular MI content and displayed decreased proliferation, decelerated differentiation and retarded mineralization *in vitro*. More importantly, continuous MI supplement not only partially restored the abnormal bone phenotypes and reversed the abnormal cellular functions of the MSCs and osteoblasts in adult SMIT1$^{-/-}$ mice, but also benefited the bone structure in SMIT1$^{+/+}$ mice.

CONCLUSION SMIT1 and MI are essential for osteogenesis, bone formation and BMD determination.

E*03* TGF-beta up-regulates CXCR4 expression in osteoclast precursors via Smad3/Smad2 pathway

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Osteoclasts are major cells responsible for bone resorption, which play an important role in both physiological and pathological conditions. Directional migration of osteoclast precursors (pre-OCs) is a key step for osteoclast development, differentiation and activities. Pre-OCs express various chemokine receptors and our previous study suggested that CXCR4 was expressed and up-regulated by TGF-b in pre-OCs. CXCR4 is a chemokine receptor that involve in cell migration and differentiation. SDF-1 is the only ligand that combines to CXCR4 and exerts its role in both physiological and pathological condition.

Aims: Our previous study indicated that TGF-b up-regulates CXCR4 expression in pre-OCs. The present study is to investigate the signal transduction pathway that involve in TGF-b up-regulated CXCR4 expression in pre-OCs and the function of corresponding pathway in migration of pre-OCs.

Methods Mouse macrophage cell line RAW 264.7 was used as pre-OCs. Bone marrow cells from mouse were in incubated in a-MEM with M-CSF (25 ng/ml) for 48 hours as primary pre-OCs. CXCR4 expression was measured by RT-PCR and cell migration to SDF-1 was studied using Transwell. The signal transduction pathway for CXCR4 expression up-regulated by TGF-b was studied by incubation of the cells with TGF-b and various signal transduction molecule inhibitors. Phosphorylation of Samd2 was studied using Western blot.

Results 1. TGF-b up-regulated CXCR4 expression in pre-OCs RAW 264.7 cells was almost completely inhibited by Smad3 inhibitor SB 431542. Inhibition of CXCR4 expression by SB 431542 also suppressed migration of pre-OCs to SDF-1. These results were confirmed using primary pre-OCs.2. TGF-b induced phosphorylation of Smad2, an important signal molecule in TGF-b

induced signal transduction pathway in pre-OCs, which accompanying up-regulation of CXCR4.

Conclusion TGF-b combined to its receptor can activate Smad2/Smad3 complex by inducing their phosphorylation as well as up-regulation of CXCR4 expression. The present study indicates that inhibition of Smad2/Smad3 complex can suppress TGF-b up-regulated CXCR4 expression in pre-OCs and cell migration. This study, therefore, provides new molecule target for prevention and treatment of bone loss in inflammatory diseases.

E*04* The Effects of Selective Serotonin Receptor Inhibitor(SSRI) on Bone Mineral Density(BMD) in postmenopausal Korean women with raloxifene treatment

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Background Selective Serotonin Receptor inhibitor (SSRI) are class of antidepressants that block the serotonin transporter indicated for the treatment of depressive and anxious symptoms.. Osteoblast and osteocytes express functional serotonin transporters. This study is performed to determine the change of BMD and bone turnover marker after using SSRI in postmenopausal Korean women with raloxifene treatment.

Methods We evaluated postmenopausal Korean women aged over 50 treated with raloxifene for osteoporosis who visited the climacteric clinic in seoul from January of 2003 to December of 2008 retrospectively. We categorized the patients with raloxifene as nonuser (used no SSRI over 1year ; n=33) and SSRI users (used SSRIs over 1year ; n=29). The changes of lumbar and femur bone mineral density (BMD) and bone turnover markers were evaluated in each group.

Results The change of lumbar BMD in SSRI users(n=29) was sigmificantly lower than that of non SSRI users (n=33[$p<0.05$])(-2% compared with 1.89% of BMD)in postmenopausal women with raloxifene. There was no significant difference between SSRI user and non-user in femur BMD and bone turnover markers.

Conclusion This study suggest that SSRI might reduce the effect of SERM and have decreasing effects on the lumbar bone mineral density in Korean postmenopausal woman. Further research is needed to confirm this finding in widespread SSRI users and the cause of differences between the lumbar and femoral BMD.

E*05* Periostin Gene is Associated with BMD Variation and Risk of Vertebral Fracture

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Objectives Periostin is a regulator of osteoblast differentiation and bone formation but whether it might affect the susceptibility to osteoporosis is unclear. In this study, the association of periostin (POSTN) gene with BMD variation and vertebral fractures risk was investigated in 1,572 subjects with extreme low or high BMD.

Methods We adopted a gene-wide and tag single nucleotide polymorphism (tSNP) based association method followed by an imputation based verification and identification of causal variant. Single marker and haplotype association analyses were performed with PLINK toolset and the imputation analyses with MACH software. BMD was measured at lumbar spine (L1-4) and femoral neck (FN) by dual X-ray absorptiometry (Hologic QDR 4500, Waltham, USA). Morphometric vertebral fractures were identified by assessing the vertebral height from thoracolumbar spine X-rays.

Results A total of 8 genotyped and 49 imputed SNPs in or around POSTN gene were studied. Four SNPs were verified to be associated with either BMD or vertebral fractures. The most significant SNP was rs9547970 (p = 0.00073, OR = 1.41), and it was also determined to be the variant that could best explain the association of POSTN.

Conclusions Our results suggested POSTN as a novel candidate gene associated with BMD variation and risk of vertebral fracture.

E*06* Healing of Bisphosphonate-Associated Osteonecrosis of the Jaw with Intermittent Parathyroid Hormone [rhPTH(1-34)]

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Bisphosphonates (BPs) are commonly used to manage osteoporosis, Paget disease, and treat hypercalcemia of malignancy or metastatic bone lesions. Among oral medication for osteoporosis (in addition to calcium and vitamin D), BPs predominated the market. Since 2003, some cases of ONJ also have been described among users of oral BPs. At the present time, treatment options for patients with bisphosphonate-associated osteonecrosis of jaw (BRONJ) are limited and mostly symptomatic. We will report a case of BRONJ, who are treated successfully with intermittent parathyroid hormone (rhPTH 1-34).

A 72-year-old female, sustained a painful fistula after dental implants 6 months before. She had receiving weekly Alendronate for 4 years. She undertook sequestrectomy of necrotic bone, oral antibiotics and oral irrigation with aqueous iodine solution. After 5 months of therapy, the situation did not improve and deteriorated. She was stared on anabolic therapy with Teriparatide (20μg Eli Lilly) in May 2006. After 5 months of Teriparatide therapy, significant bone regeneration was found and mandibular fistula being healed). At 10 months follow-up the panoramic radiograph showed complete resolution of necrotic region and she undertook another dental implantation.
The purpose of this report is to introduce a possible treatment option that may be beneficial to the BRONJ.

E*07* A comparison of the survival rate of the initial hip fracture patients with and without subsequent major long bone fracture of the extremity

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E*08* 18970 例上海健康男性和女性髋部几何结构参数的分析

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研究目的 股骨近端骨强度不仅与骨密度（BMD）有关,而且与髋部的几何结构有关。本研究旨在建立上海市健康男性和女性髋部几何结构参考值数据库，了解髋部几何结构参数在两性中随年龄的变化趋势。
方法 筛选 4100 例男性(15-99 岁)和 14870 例女性(15-101 岁)共 18970 个研究对象,所有对象均为居住在上海 30 年以上的汉族人。采用 Lunar Prodigy 双能 X 线吸收仪检测所有研究对象左侧股骨近端（股骨颈、大转子、转子间和全髋）BMD，并用髋部结构分析软件（HSA）分析髋部几何结构。髋部几何结构参数包括：髋部轴长（HAL）、截面面积（CSA）、截面惯性矩（CSMI）和跌倒指数（FI）。按照每 5 岁一组，男性和女性各分为 15 组。
结果 在男女性中，CSA、CSMI 和 FI 均与年龄呈显著负相关；HAL、CSA、CSMI 与身高和体重呈显著正相关，而 FI 与体重和 BMI 显著负相关；CSA、CSMI 和 FI 均与股骨近端 BMD 显著正相关，其中 CSA 与股骨近端 BMD 相关性最强（P均<0.01)。各髋部几何结构参数峰值年龄分别如下：HAL 在男性和女性均为 35-39 岁；CSA 在男性为 20-24 岁，在女性为 30-34 岁；CSMI 在男性为 35-39 岁，在女性为 30-34 岁；

FI 在男性为 20-24 岁，在女性为 30-34 岁。经校正身高和体重后，则 HAL 分别在男性 45 岁、女性 65 岁后随着增龄而增长；CSA 在男性 40 岁和女性 60 岁后随着增龄而递减；CSMI 在男性各年龄组差异无统计学意义，在女性 60 岁后随着增龄而递减；FI 在男性 60 岁、女性 50 岁后随着增龄而递减。

结论 本研究建立了上海市健康男性和女性髋部几何结构参数的参考值数据库，同时通过髋部几何结构参数在两性中不同年龄的分布，提示随着增龄髋部几何结构参数的变化反映了股骨近端骨强度的下降，这可能是老年男女性髋部骨折风险增加的原因之一。

E*09* Activation of b-Catenin Signaling in Articular Chondrocytes Leads to Osteoarthritis-like Phenotype in Adult b-Catenin Conditional Activation Mice

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Objective In order to obtain direct evidence about the role of b-catenin in functions of articular chondrocytes and the development of OA, we have generated β-catenin conditional activation mice by breeding b-*catenin*$^{fx(Ex3)/fx(Ex3)}$ mice with the newly developed *Col2a1-CreER*^{T2} transgenic mice. Tamoxifen induction was performed in 3- and 6-month-old resulting *Col2a1-CreER*^{T2}*;b-catenin*$^{fx(Ex3)/wt}$ hybrid mice. Changes in articular chondrocyte maturation and articular cartilage morphology were analyzed in these mice.

Materials and Methods *Col2a1-CreER*^{T2} transgenic mice were bred with *Rosa26* reporter mice. Tamoxifen induction was performed at ages of 3 and 6 months in *Col2a1-CreER*^{T2}*;R26R* mice. X-Gal staining was performed 2 months after TM induction. *Col2a1-CreER*^{T2} mice were then bred with b-*catenin*$^{fx(Ex3)/fx(Ex3)}$mice. Changes in articular cartilage morphology were examined by histological and histomorphometric methods and expression of articular chondrocyte marker genes was analyzed by real-time PCR using primary articular chondrocytes derived from β-catenin cAct mice.

Results Administration of tamoxifen (TM) into 3- and 6-month-old *Col2a1-CreER*^{T2}*;R26R* mice results in an articular chondrocyte-specific and efficient Cre-recombination in 5- and 8-month-old adult *Col2a1-CreER*^{T2}*;R26R* mice two months after TM induction. b-catenin cAct mice were generated by breeding *Col2a1-CreER*^{T2} transgenic mice with b-*catenin*$^{fx(Ex3)/fx(Ex3)}$ mice and by administration of TM into 3- and 6-month-old resulting *Col2a1-CreER*^{T2}*;b-catenin*$^{fx(Ex3)/wt}$ hybrid mice. Expression of chondrocyte marker genes is significantly increased in articular chondrocytes of b-catenin cAct mice. Histological analysis showed that age-dependent destructions of articular cartilage were observed in b-catenin cAct mice.

Conclusions Activation of b-catenin signaling in articular chondrocytes in adult mice leads to the

premature chondrocyte maturation and the development of OA-like phenotype.

E*10* The Function of Gene Mutation in 1αHydroxylase （CYP27B1）

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Objective: Pseudo-Vitamin D-Deficiency Rickets (PDDR), is a rare autosomal recessive disorder characterized by the early onset of rickets with a severe syndrome of rickets，and the cause of the disease is mutations in the 25-hydroxyvitamin D 1α- hydroxylase (1α-hydroxylase, CYP27B1) gene. We did identify 4 novel mutations in 5 Chinese patients before but no function study was done. So we established an overexpression cell culture model of CYP27B1 in vitro, expressed both the wild type and the mutant gene, detected their hydroxylation products to analyze whether there were difference between the activity of wild type and the mutant gene and whether there were relationship between the mutant gene activity and the clinical feature.

Methods: In order to get the mutant gene G57V and L333F, we did the site direct mutagenesis to the cDNA(pCMVXL5-CYP27B1), amplificated the plasmids in E. coli, then extracted the plasmids to get sufficient DNA for transfection. Human CYP27B1 expression plasmids (pCMVXL5-CYP27B1) containing the wild type and the mutant CYP27B1gene were transfected into 293T cell by lipofectamine to establish an overexpression cell culture model. We added different amount of $25OHD_3$ to each plate 36h after transfection to make different concentration of substrate. Then we incubated the plates in 37℃，5%CO_2 for 8h and observe the enzymatic catalysis reaction. We collected the cell culture fluid ,did the extraction and purification through the cartridge pack，and the radioimmunoassay for $25OHD_3$ and 1，25（OH）$_2$D in all the sample. Then we did the split-plot design factor analysis using SPSS to see whether there were significant difference between the wild type and mutant gene. To prove the expression of CYP27B1, we extracted the total protein of the transfected 293T cell, and then did the western blot for the CYP27B1 protein.

Results: We successfully established the 293T overexpression cell culture model, and in 293T overexpression cell culture model, the expression of wild type and the mutant CYP27B1 gene were proved similar. There were enzymatic activity in expression product of both wild type and mutant gene, because both of them could produce detectable 1，25（OH）$_2D_3$. There were significant difference in enzymatic activity between the wild type and the mutant gene expression products.

Conclusion: The data proved that there were significant differences in enzymatic activity between the wild type and the mutant gene G57V and L333F, and there was some relationship between the mutant gene activity and the clinical feature of the patients.

E*11* Blood homocysteine is correlated with bone mass and bone turnover rate, not with bone size in postmenopausal women

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The Korean Society of Osteoporosis

Hyperhomocysteinemia is related to fractures due to osteoporosis. We assessed the relation between blood homocystein and bone mass, size, bone turnover rate. This study included 2,670 postmenopausal wemen who underwent periodic health examination in ajou university health promotion center, from January 2002 to December 2003. Serum homocysteine, bone turnover marker and bone mineral density were measured. The age,osteocalcin,25-vit D,total lumbar BMD,total lumbar T- score,very low lumbar BMD,very low lombar T-score,femur neck BMD,femur neck T-score,femur trochanteric BMD and femur trochanteric T-score showed a significant correlation with the serum total homocysteine. However, after adjusting for age, the only osteocalcin is significantly correlated with the serum total homocysteine, At 3rd lumbar vertebra, the BMC,volumetric BMD and areal BMD showed a significant correlation with the serum total homocysteine but the bony size and the volume were not significant. Even after adjusting for age, the 3rd lumbar BMD is significantly correlated with the serum total homocysteine. Our study show that serum total homocysteine is correlated small but significantly with bone mass, bone turnover rate but not with bone size.

E*12* A pilot study on the synergetic effect of anti-resorptive and anabolic treatements on ovariectomized rats

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Introduction Osteoporosis is a progressive debilitating disorder associated with reduction in bone mass often leading to pathological fractures [1]. After years of basic and clinical studies, two distinct classes of drugs namely the anabolic and anti-resorptive drugs were found to be effective in the treatment of osteoporosis. Commonly used anabolic drug is the recombinant human parathyroid

hormone (hPTH), which stimulates the bone formation [2-4]. The third generation nitrogen-containing bisphosphonates (eg., Ibandronate) have been successfully used in suppressing bone resorption [5, 6]. Whether the use of both bisphosphonate and the hPTH would have a synergetic effect on postemenopausal osteoporosis is still controversial [7, 8]. Previous studies indicated that a combined administration of hPTH and alendronate has no synergetic effect in terms of bone mineral density (BMD) and biomarkers [4]. However, BMD measurements are inadequate as they have limitation in evaluating structural property as well as the trabecualr architecture [9]. Through this study, we aim to investigate the effect of individual and combined administration of ibandronate and hPTH on the ovariectomized (OVX) rat models, in terms of structural, mechanical and viscoelastic analyses.

Methods Sixty female Sprague-Dawley rats between the ages of 6 to 8 weeks were randomly divided into five groups namely, SHAM, OVX, OVX+PTH, OVX+IBAN and OVX+PTH+IBAN, with 12 rats in each group. The rats were ovariectomized following one week of acclimatization. Meanwhile, SHAM group were subjected to sham surgery. Both SHAM and OVX rats were administered the vehicle whereas corresponding drugs (hPTH, Ibandronate) were administered to the other groups starting from the fourth-week post surgery. In-vivo pQCT scanning and serum collection were done once in two weeks. Following surgery, 3 rats from each group were euthanized after 4, 8, 10 and 12 weeks. The bone samples (femur, tibia and L4 vertebrae) were harvested and preserved at -20^{o}C.The femoral samples were subjected to dynamic mechanical analysis and ex-vivo pQCT scanning, whereas the tibia were subjected to three-point bending and micro-CT analysis. L4 vertebrae were subjected to compression test. Thus, the effect of ovariectomy and the efficacy of the drugs were analyzed based on structural, mechanical and viscoelastic parameters. Biomarkers for both bone formation and resorption were also studied by using serum biomarkers (P1NP & LAPs).

Results All the structural, mechanical and viscoelastic tests showed a significant difference between SHAM and OVX group, indicating that osteoporotic-like condition had been simulated successfully in the rat models.The micro-CT and pQCT indices showed that IBAN and PTH group had significantly higher bone mineral density than OVX group, IBAN group having significantly higher BMD than the PTH group. The synergetic administration of ibandronate and PTH does not show any significant difference from the individual treatment groups. 3-pt bending test showed that the failure load, yield load and stiffness of the IBAN and PTH group were significantly higher than that of the OVX group. The failure load of IBAN group was significantly higher than the PTH group. The synergetic administration of drugs did not show significant deviation from the individual treatments in terms of mechanical tests too. However, the viscoelastic analysis showed that the OVX+PTH+IBAN group to have significantly higher damping properties (in terms of tan d) than the individual treatments.

Conclusion Ibandronate administration showed to restore the bone mass better than the PTH administration. Although synergetic administration of IBAN and PTH did not show apparent variation than the individual treatments in terms of BMD and failure load, viscoelastic parameters showed that the combined treatment yielded better damping property than the individual treatments. The viscoelastic response of anabolic and anti-resorptive treatments may explain the unexpected fractures with increased BMD values especially those who were on the osteoporotic treatment. Moreover, the increased damping in concurrent treatment may be combined with BMD changes for better prediction of fracture risk. However, large-scale studies are required to prove the effect of synergetic treatment on the viscoelastic response of bone and to find the correlation between the viscoelastic, mechanical and structural properties of the bone.

E*13* Association of Parafibromin with Parathyroid tumors

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Objective: Parathyroid carcinoma (PC) is a rare reason of primary hyperparathyroidism, but it is lethal. It is frequently difficult to establish diagnose whether a tumor is malignant or benign especially in early stage. The purpose of this study is to detect the expression of parafibromin encoded by HRPT2 tumor suppressor gene in parathyroid tumors, and investigate whether it can be a tumor marker for identifying parathyroid tumors.

Patients and design: We performed parafibromin immunostaining by immunohistochemistry in paraffin imbedding parathyroid specimens from 16 patients with primary parathyroid carcinoma (PC), 22 patients with primary parathyroid adenoma (PA), 8 patients with parathyroid hyperplasia (PH), 6 normal parathyroid tissue as control, and analysis the relationship between parafibromin expression and pathologic character of parathyroid tumor.

Results: The expression of parafibromin: strong staining in 6 normal tissues ,negative staining in 10/16（62.5%） PC, staining weaker than the normal in 6/16 PC; only 1(4.5%)PA is negative staining; strong staining in all PH. All of strong stainings are benign. Parafibromin expressions have a significant difference between PC and PA/PH ($p=0.000$，$p=0.006$).

Conclusions: Parafibromin strong stainings signify benign lesions, negative staining has high associativity and specificity with PC, it is valuable for predicting PC, but the diagnose value remains to be proved.

E*14* Fast evaluation of Iliac crest trabecular bone elastic properties

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AIMS Finite element analysis (FEA) is generally used for indirect evaluation of mechanical properties of trabecular specimens which is vital for fracture risk prediction. However, the finite element methods (FEM) can be computationally expensive. In this study, we propose the reduced basis (RB) methods, which correlate well with the typical finite element (FE) results, despite a considerable gain in overall computational speed.

METHODS Three cylindrical iliac crest specimens (diameter: 8mm, length: 7mm) were obtained from healthy subjects (20 year, 24 year old females and 40 year old male) and scanned using micro-CT. Cubic samples of dimensions 1.5 mm x 1.5 mm x 1.5 mm were extracted from the cylindrical specimens for FE analysis. A validated in-house linear elastic FEM code based on four node tetrahedron elements was used to perform the analysis. Subsequently, a FEM solution library (test space) was constructed for each of the specimens by varying the material property parameters; the elastic modulus and Poisson's ratio. Consequently, the library was utilized to develop fast RB algorithms. The average computational speed gain obtained by the RB methods for the samples and their accuracy relative to the FEA was evaluated. Furthermore, the spatial distribution of von-Mises stress, axial strains and shear strains was studied for the samples for a fixed set of material properties.

RESULTS Online computational speed gains greater than 2000 were obtained for the specimens for a compromise of less than 1% accuracy in the maximum value of von-Mises stress, assuming the FE solution to be the standard for comparison. The computational times were reduced from more than 1 hour to less than 2 seconds. For a fixed set of material properties, it was observed that the spatial distribution of von-Mises stresses and strains was as expected from the physics and symmetry of the problem.

CONCLUSIONS The RB solution converged rapidly over the chosen test space, comprising of selected basis vectors. The hypothesis that the methods can be used as a tool for rapid indirect estimation of material properties has been proven in this study.

E*15* Evaluation of the Local Buckling Strength provided by the Trabecular Bone to the Proximal Femur in the Fall Mode

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AIMS Aging and osteoporosis cause thinning cortices, expansion of outer diameter and loss of internal trabecular support which may lead to local buckling, a different form of instability. In our previous work, we performed the stability analysis of only the femoral neck's cortex. In this study, we performed a series of stability analyses on tubular structures simulating femoral neck cortex as well as trabecular bone geometries using observed dimensions from elderly fracture controls. The ultimate goal is to make the simulations more realistic by considering bone's structural properties in greater detail.

METHODS We generated three dimensional models of the femoral neck using dimensions from studies of three non-fractured controls with patient numbers #98079, #99048, #98116 (57 year female, 68 male and 63 year old male respectively). Narrowest cross-section along the femoral neck was selected from each patient for FSM analysis. To evaluate the contribution of trabecular bone to buckling strength of femoral neck, we developed Finite Strip models of each cross-section with cortex only and with both cortex and trabecular core and compared the elastic local buckling stress between them.

RESULTS Using these models for each specimen, the consequence of a fall on the greater trochanter was evaluated. The Finite Strip Method (FSM) was used to investigate the association between local buckling at the femoral neck and the load to failure strength under physiologic loads. It was observed that the trabecular core contributed to a considerable increase in both the local elastic buckling load and predicted failure loads in all three patients. The trabecular bone contributed to significant increase in the predicted failure load in one patient (#98116). It has to be noted that the strength contribution to other patients (#98079, #99048) was also considerable.

CONCLUSIONS In our current study, we evaluate the contribution of trabecular bone to the predicted failure load of the femoral neck section. It has to be noted that the contribution of trabecular bone to both the local buckling strength and predicted strength in the female patient (#98079) are lower compared to those of the male patients, although she is younger than them. It is possible that the trabecular bone's contribution in men and women may be different in general. In summary, inclusion of trabecular bone in the FSM analysis gives evidence of the increase in the overall strength of femoral neck in the fall mode.

E*16* Both Endogenous and Exogenous PTH Stimulate Bone Fracture Healing

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Aims: To demonstrate whether both endogenous and exogenous PTH enhance bone fracture healing by stimulating osteogenic bone formation.

Methods: Closed mid-diaphyseal femur fractures were created and stabilized with an intramedullary pin in 8-week-old wild-type (WT) and PTH null ($PTH^{-/-}$) mice. Mice received daily injections of vehicle (V) or of PTH1-34 (80 μg/kg) for 1-4 weeks post-fracture, and callus tissue properties was analyzed at 1, 2 and 4 weeks post-fracture by radiography, micro-CT, histology, histochemistry and immunohistochemistry. RNA and proteins were isolated from callus tissues and bone formation related gene and protein expression levels were evaluated by real-time RT-PCR and Western blots.

Results: At 1 week post-fracture, cartilaginous callus areas were reduced in V-treated and PTH-treated $PTH^{-/-}$ mice compared to V-treated and PTH-treated WT mice respectively, but were increased in both PTH-treated WT and $PTH^{-/-}$ mice compared to V-treated WT and $PTH^{-/-}$ mice respectively. In contrast, at 2 weeks post-fracture, remnant cartilaginous callus areas were increased in V-treated and PTH-treated $PTH^{-/-}$ mice compared to V-treated and PTH-treated WT mice respectively and were reduced in PTH-treated WT and $PTH^{-/-}$ mice compared to V-treated WT and $PTH^{-/-}$ respectively. As well, at 2 weeks post-fracture, the mineral density in callus and bony callus areas, the mRNA levels of ALP, type I collagen and osteocalcin, and the protein levels of Cbfa1 and IGF-1 were reduced in V-treated and PTH-treated $PTH^{-/-}$ mice compared to V-treated and PTH-treated WT mice respectively and were increased in PTH-treated WT and $PTH^{-/-}$ mice compared to V-treated WT and PTH-treated $PTH^{-/-}$ mice respectively. At 4 weeks post-fracture, total collagen positive bony callus areas, osteoblast number, ALP positive areas and type I collagen positive areas were all reduced in V-treated and PTH-treated $PTH^{-/-}$ mice compared to V-treated and PTH-treated WT mice respectively and were increased in PTH-treated WT and $PTH^{-/-}$ mice compared to V-treated WT and $PTH^{-/-}$ mice respectively. At 2 and 4 weeks post-fracture, TRAP positive osteoclast number and surface were also reduced in V-treated and PTH-treated $PTH^{-/-}$ mice compared to V-treated and PTH-treated WT mice respectively, but were increased in PTH-treated WT and $PTH^{-/-}$ mice compared to V-treated WT and $PTH^{-/-}$ mice respectively.

Conclusion: These results indicate that both endogenous and exogenous PTH enhance bone fracture healing by increasing callus areas, endochondral bone formation and osteoblastic bone

formation.

Key words: PTH, bone fracture healing, gene knockout mice

C01 Genistein inhibits osteolytic bone metastasis and enhances bone mineral in nude mice

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Aims To investigate the effective activity of genistein on osteolytic bone metastasis and bone mineral in nude mice.

Methods Female BALB/c-nu/nu mice aged 5 weeks were injected with estrogen receptor-negative human breast cancer cells, MDA-MB-231, into left cardiac ventricle to form osteolytic bone metastases, and given genistein daily subcutaneously according to the following three experimental protocols. Protocol 1: genistein (10mg/kg/day) was injected after small but defined osteolytic bone metastases had been observed on radiographs taken 21 days after inoculation of breast cancer cells; Protocol 2: three dosages of genistein (5, 10 and 15mg/kg/day) were given simultaneously with cancer cells inoculation through the entire experimental period; Protocol 3: genistein (10mg/kg/day) was administered prophylactically 7 days before inoculation of cancer cells. At the end of the experiments, that is, 38 days after cancer cell inoculation, all animals were examined by radiography under anesthesia for assessment of the number and volume of osteolytic bone metastases, then sacrificed by cervical dislocation. Blood samples were immediately collected for measurements of serum biochemical parameters, such as serum calcium, phosphorus and alkaline phosphatase levels. The left hindlimb of each mouse was made to paraffin sections and stained with tartrate-resistant acid phosphatase (TRAP) for analysis of the osteoclast activity. The proximal extremity of right tibia embedded undecalcified in methylmethacrylate and stained with Goldner's Trichrome Method was used for bone histomorphometrical analysis including bone mass and microstructure parameters: trabecular area (Tb.Ar%), trabecular number (Tb.N), trabecular thickness (Tb.Th), and trabecular separation (Tb.Sp).

Results In all protocols, genistein (10mg/kg/day) markedly reduced the number and volume of osteolytic bone metastases assessed by radiography and the number of TRAP-positive osteoclasts. Histomorphometrical analysis revealed that genistein markedly increased trabecular area (Tb.Ar%), trabecular number (Tb.N) and trabecular thickness (Tb.Th), and decreased trabecular separation (Tb.Sp). Furthermore, in protocol 2, genistein showed equivalent effect on bone in medium dose (10mg/kg/day) and high dose (15mg/kg/day).

Conclusions These results thus demonstrate that genistein could exert a beneficial effect on bone

health in therapeutic and prophylactic administration by inhibiting osteolytic bone metastases, suppressing bone resorption, increasing bone mass and improving bone microstructure in a preclinical mouse model of breast cancer bone metastases.

C02 Clinical Features of 56 Patients with Hypophosphatemic Rickets

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Objective To analyze the clinical features of 56 patients with hypophosphatemic rickets(HR) followed at our institution, and to summarize the effects of medication therapy on this disease.

Methods 56 patients with HR followed in our hospital were retrospectively analysed. The clinical featrues and therapeutic responses were summaried, with emphasis on the impact of combination therapy with VitD metabolites and phosphate on patients' height.

Results 56 patients with HR came from 51 unrelated family, the male-to-female ratio is 23:33 and 23 patients was familial. The mean birth length of 9 patients with related records available was 49.3±2.9cm. The rickets manifestations such as lower limb deformities, gait abnormality, and growth retard were all found before 4 years old, mostly during the period of learning walking. Low-trauma fractures (all sites were long bone of extremites) occurred in 6/56 individuals; 55/56 patients had lower limb deformities, among them 19 patients had ever undergone osteotomies on at least one occasion. 6/16 individuals had experienced dental problems. The height of the group of combination treatment with active VitD metabolite and phosphate(n=9) was significantly higher than that of untreated group(n=37)(-1.71±1.00，-3.04±1.11；P<0.05)，The mean Z-score of 14 patients with final height achieved in untreated group is -3.63±0.93. The BMD was determind by DXA in total 20 patients, the Z-score of which in L2~4 is elevated as a whole either in untreated patients（n=7）or in patients that had been treated（n=13） (median: 1.9, 2.0, respectively)；During the treatment, PTH was markedly elevated to be higher than 150pg/ml in 4/26 patients，and nephrolithiasis was found in 2 patints; In follow-up period, no spontaneous relieve was found.

Conclusions Typical manifestations of rickets can occur in most patients with HR if effective therapy are not given in time. The combination therapy with active VitD metabolites and phosphate can be effective to improve the height. The BMD characteristic of HR patients can be: the BMD in lumbar isn't low, but that in long bone of extremities can be low. Medication therapy can induce the significant elevation of serum PTH level, so strict follow-up is needed.

C03 Regional effects of extracorporeal shock waves on the osteoporosis rabbit model

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Aims To evaluate the effects of Extracorporeal shock wave (ESW) on bone mineral density, micro-architecture, and biomechanical properties of osteoporotic rabbit femoral condyle in vivo. To explore a new method for the prevention and treatment of osteoporosis.

Methods 22 six months old female rabbits were induced to osteoporosis by Ovariectomy (OVX) and methyl prednisolone (MP), and divided randomly into two group for ESW treatment. The left femoral condyle of rabbits were treated by ESW with 0.12mJ/mm^2 or 0.50mJ/mm^2 energy flux density and 2000 impulses at frequency of 4 Hz. The right femoral condyle received no treatment and served as the contralateral control. Two months later, 5 animals of each group were sacrificed to observe the new bone formation with bone fluorescent labeling and histological examination. The other rabbits were housed for 6 months after ESW treatment for measurements below. Serum for alkaline phosphatase assay was collected from ear vein of rabbits before ESW treatment, and then followed up at 1 month, 2 month, 3 month, and 6 month after the treatment. BMD of femoral condyle was measured by DEXA before OVX, before ESW treatment, and 6 months after ESW treatment. Then the rabbits were sacrificed. Bone microarchitecture and biomechanical properties were evaluated with microCT and compression test.

Results The mineral appositional rate at the treatment sites was significantly higher than that of the contralateral control for both 0.12mJ/mm^2 (21.1% higher, $P<0.05$) and 0.50mJ/mm^2 (27.6% higher, $P<0.05$) energy flux density ESW group. There were no significant difference in low energy flux density group and high energy flux density group. More new bone was found also by histological examination at treatment sites compared with the contralateral control. The bone alkaline phosphatase activity showed a cumulative increase over the first three months after ESW treatment for both groups. The peak activity of 0.12mJ/mm^2 group was 38% higher than the baseline, while the 0.12mJ/mm^2 group was 53% higher than the baseline.6 months after ESW treatment, BMD of femoral condyle was significantly higher than that of the contralateral control for both 0.12mJ/mm^2 and 0.50mJ/mm^2 energy flux density ESW group. The microCT analysis showed that the trabecular thickness, bone volume fraction and trabecular connectivity density significantly increased ($P<0.05$) and bone surface/bone volume decreased ($P<0.05$) compared with that of the contralateral control. Degree of anisotropy of the treated cancellous bone was higher than control and structure model index was lower which revealed that the cancellous osteoporosis was improved. The results of biomechanical test showed that the maximum strength (17%, $P<0.05$) and energy absorption capacity (19%, $P<0.05$) in 0.12mJ/mm^2 energy flux density ESW group were significantly higher than

those in the control. The maximum strength (16%, $P<0.05$) , stiffness (24%, $P<0.05$) and energy absorption capacity (16%, $P<0.05$) in 0.50mJ/mm^2 energy flux density ESW group were significantly higher than those in the control. Biomechanical properties of cancellous bone after ESW treated were proved. No significant difference was found in the two ESW treatment groups.

Conclusions ESW can promote new bone formation in local cancellous bone of osteoporosis model, enhance bone quantity and bone quality of local cancellous bone, and then reduce the risk of osteoporotic fracture. ESW treatment has the potential to be developed into a new preventive treatment for osteoporotic fractures.

C04 Bone Marrow Ablation Demonstrates Bone Anabolic Actions of Endogenous PTH in 25-Hydroxyvitamin D-1α-Hydroxylase Null Mice

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Aims: To determine whether endogenous PTH plays a role in stimulating bone marrow production of osteogenic cells *in vivo*.

Methods: Mechanical bone marrow ablations were performed in tibiae and femurs of 6-week-old wild-type (WT) and 25-hydroxyvitamin D-1a-hydroxylase null [1α(OH)ase$^{-/-}$] mice. 1α(OH)ase$^{-/-}$ mice and WT littermates were maintained on a normal diet, and 1α(OH)ase$^{-/-}$ micehad hypocalcemia, hypophosphatemia and high levels of endogenous PTH. Newly formed bone tissue in the diaphyseal regions were analyzed at 1 and 2 weeks postsurgery by histopathology. RNA and proteins were isolated from diaphyseal regions and bone formation related gene and protein expression levels were evaluated by real-time RT-PCR and Western blots, respectively.

Results: At 1 week postsurgery, bone formation parameters including trabecular volume, osteoblast numbers, ALP positive areas, and type I collagen positive areas were all increased significantly in 1α(OH)ase$^{-/-}$ mice compared to WT mice (33.1±1.3 versus 22.2±2.0%; 54.3±3.8 versus 31.3±2.6/mm^2; 4.31±0.27 versus 1.15±0.13%; and 31.6±2.1 versus 20.3±2.0%, respectively). Consistent with the histomorphometric observations, gene expression levels of Cbfa1, ALP, type I collagen and OCN, and protein expression levels of Cbfa1, PTHR and IGF-1 levels were also increased significantly in 1α(OH)ase$^{-/-}$ mice at 1 week postsurgery. At 2 week postsurgery, although gene expression levels of ALP, type I collagen and OCN had decreased, trabecular volume, osteoblast number, ALP positive area, and type I collagen positive area were all still significantly

higher in 1α(OH)ase$^{-/-}$ mice than in WT mice (41.8±2.3 versus 11.9±1.4%; 74.3±5.8 versus 43.3±4.1/mm^2; 8.47±0.73 versus 1.47±0.11%; and 40.9±2.2 versus 7.9±0.5%, respectively). At 1 week postsurgery, TRAP positive osteoclast number and surface were reduced (11.9±1.9 versus 39.3±4.4/mm^2; 4.0±0.3 versus 7.9±0.5%, respectively), however at 2 weeks postsurgery, TRAP positive osteoclast number was increased but TRAP positive osteoclast surface was still reduced in 1α(OH)ase$^{-/-}$ mice compared to WT mice (39.7±4.2 versus 24.3±3.2/mm^2; 4.5±0.3 versus 9.2±0.3%, respectively). Consistent with the histomorphometric observations, the ratio of RANKL/OPG gene expression was reduced at 1 week postsurgery, but were increased at 2 weeks postsurgery in 1α(OH)ase$^{-/-}$ mice compared to WT mice.

Conclusion: These results indicate that endogenous high PTH plays a role in bone formation by stimulating marrow osteogenic cells *in vivo.*

Key Words: bone marrow ablation, PTH, Vitamin D deficiency

C05 69 例成骨不全家系致病基因突变检测

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目的 成骨不全是最常见的遗传性代谢性骨病，而国内尚未有大样本量的家系致病基因突变分析资料。本研究对临床诊断的成骨不全（I-IX 型）69 例先证者及其家系成员检测 I 型胶原 a1 链基因（COL1A1）、I 型胶原 a2 链基因（COL1A2）、软骨相关蛋白基因（CRTAP）和编码脯氨酸羟化酶基因（LEPRE1）突变位点，分析基因型与临床表型的关系。

方法 对 69 例先证者和 126 例家族成员（包括父母亲和兄妹等）进行 COL1A1、COL1A2 CRTAP 和 LEPRE1 基因编码区 DNA 序列检测，试图发现突变位点。

结果 69 例先证者中，发现有致病基因突变存在共 47 例，其中 COL1A1 基因突变为 34 例（72.3%），COL1A2 基因突变为 11 例（23.4%），LEPRE1 基因突变 2 例（4.3%），但未发现 CRTAP 基因突变。上述基因突变位点近 30%为新突变。4 例患者为相同的 COL1A1 基因 Gly767>Ser 突变（位于 33 外显子区），是中国人成骨不全突变热点。而且，突变基因型与临床表型存在一定的关系。

结论 本研究是国人成骨不全最大样本量致病基因突变检测结果的报告，发现 COL1A1 是中国人成骨不全发病的最常见致病基因，我们还发现了 2 个隐性遗传性成骨不全罕见的 LEPRE1 基因复合杂合突变。本研究对开展成骨不全产前诊断提供了重要依据，以此切实降低该遗传性骨病的发病率。

C06 PRDM16 基因多态性与核心家系男性体脂分布和峰值骨量变异的关联研究

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目的 转录调节因子 PRDM16 在肌细胞以及棕色脂肪细胞相互转化之间起着双向开关作用。PRDM16 通过结合 PPAR-gamma 以及激活其转录活性而刺激棕色脂肪形成。棕色脂肪前体细胞缺乏 PRDM16 基因调控可使棕色脂肪性状缺失并刺激其向肌细胞分化，相反，肌细胞内异位表达 PRDM16 可诱导其向棕色脂肪细胞分化。目前，关于 PRDM16 基因在人群中的相关研究尚未有报道。因此，本研究的目的为探讨 PRDM16 基因多态性与中国核心家系男性肌肉组织，脂肪组织以及峰值骨密度正常变异之间关系。

方法 我们入选了 400 家男性核心家系，包括父母以及至少一个 20-40 岁的健康儿子，共 1215 例。结合国际人类基因组计划挑选了 PRDM16 基因的 10 个标签单核苷酸多态位点。使用 TaqMan 基因分型技术在核心家系中对此 10 个位点进行基因分型，并研究这些位点与人体各部位的肌肉，脂肪组织以及峰值骨密度正常变异之间的联系。使用美国 GE 公司的 LUNAR prodigy 双能 X 线吸收仪进行肌肉，脂肪量以及骨密度的测量。运用数量性状传递不平衡（QTDT）方法进行数据统计。

结果 应用 QTDT 方法，各个位点基因型中不存在人群分层情况。位于 3’UTR 端的一个位点与股骨颈峰值骨密度呈家系内相关($p<0.05$)。为了避免多重检验引起的假阳性结果，我们使用 permutation 1000 次的检验，结果同样支持我们上述发现($p<0.05$)。同时我们发现此位点与 BMI、上肢的脂肪组织、下肢的脂肪组织、人体总的脂肪组织、左上肢以及右上肢的脂肪组织均呈明显的家系内相关（p 值均<0.05）。permutation 1000 次的检验，同样支持我们上述结果（p 值均<0.05）。然而，另九个位点未发现与脂肪、肌肉组织以及峰值骨密度变异的家系内相关。

结论 我们的研究首次发现，PRDM16 基因多态性对男性脂肪量以及峰值骨密度变异起一定的调控作用；PRDM16 基因可能是影响中国男性体脂以及峰值骨密度变异的候选基因。

C07 北京市东城区汉族绝经后妇女维生素 D 营养状况及其影响因素的调查

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目的：原发性骨质疏松症是由于绝经或老龄引起的骨骼退行性变。维生素 D 缺乏是原发性骨质疏松症的重要危险因素之一。本研究通过调查北京东城区汉族绝经后妇女维生素 D 营养状况、生活方式（包括饮食、运动等）、骨骼健康状况、合并慢性疾病等，了解该地区汉族绝经后妇女维生素 D 缺乏情况，分析其影响因素及其对骨骼健康的影响。

方法：对社区人群进行随机抽样选择，东城区汉族绝经后妇女 614 名，年龄 45~81 岁。对入选者进行包括一般资料，生活方式，骨质疏松相关情况，既往史和疾病治疗史，月经生育史和家族史等的问卷调查。采集研究对象 5-6 月间的血样。测定血 25(OH)D、PTH、Ca、P、ALP、Cr、Glu 等指标，其中 25(OH)D

采用酶联免疫法测定，PTH 采用发光法测定；同时测定腰部、右髋部、股骨颈和大转子的骨密度和身高、体重。

结果: 本组受试者血 25(OH)D 浓度为 12.49±5.43ng/ml(2.9～60.8ng/ml),PTH 浓度 47.47±20.24pg/ml（6.9 ～142pg/ml)。其中血 25(OH)D≤20 ng/ml 、20-30 ng/ml 和≥30ng/ml 者分别占 92.3%(n=567)，7% (n = 43) 和 0.65%（n=4)。591 名受试者按 L2-4 的骨密度 T 值进行分组，骨质疏松组（T 值≤-2.5）占 9.8%（n=58)，低骨量组（-2.5<T 值≤-1）占 37.1%(n=219)，正常组（T 值>-1）占 53.1%(n=314)。25（OH）D 水平与 PTH 值呈负相关（r=-0.211，p<0.01)，与血 Ca 值呈正相关（r=0.09，P<0.05)。未发现 25(OH)D 水平与骨密度相关。维生素 D 可能的影响因素中，仅发现 25(OH)D 水平与锻炼和体力活动情况有关（r=0.122，P<0.01)。

结论：1、本组东城区汉族绝经后妇女中维生素 D 缺乏和不足相当严重，应加以重视。2、本组受试者中血 25(OH)D 水平与 PTH 水平呈负相关，与血钙浓度呈正相关，未发现与骨密度值相关。增加体力活动的时间和活动量有助于维持绝经后妇女的维生素 D 水平。

C08 合并甲状腺功能亢进症的 McCune-Albright 综合症的临床特点及阿仑膦酸钠疗效观察

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目的 McCune-Albright 综合症是一种 G 蛋白刺激型亚单位编码基因 GNAS1 激活性突变导致的罕见疾病，本研究旨在了解此疾病的临床特点并探讨可能的治疗方案。

方法 前瞻性观察合并甲状腺功能亢进症的两例 McCune-Albright 综合症患者的临床特点，1 例患者给予抗甲亢药物他巴唑治疗，另 1 例患者接受 I^{131} 核素治疗，两例患者每周口服阿仑膦酸钠 70mg，每日服用元素钙 600mg，以治疗多骨型骨纤维异样增殖症，治疗时间分别为 1.5 年及 7 年，观察治疗前后血钙、磷、碱性磷酸酶水平、骨骼 X 线片及骨扫描的变化。

结果 MAS 是包括性早熟、皮肤牛奶咖啡斑及骨纤维异样增殖症的三联征，此综合征还与多种内分泌腺体功能亢进相关。本研究 1 例患者有典型皮肤牛奶咖啡斑，2 例均有甲状腺功能亢进症的高代谢及交感神经兴奋症状，影像学检查符合多骨型骨纤维异样增殖症，1 例患者有下颌骨病变骨骼活检的病理证实。经过抗甲亢药物或 I^{131} 治疗后，患者甲状腺功能恢复正常；经阿仑膦酸钠治疗后，患者骨骼疼痛明显减轻，血碱性磷酸酶显著下降，骨骼 X 片提示患者骨骼病变稳定。

结论 骨纤维异样增殖症合并内分泌功能亢进症或皮肤牛奶咖啡斑，应考虑 McCune-Albright 综合症的可能。McCune-Albright 综合症合并的甲状腺功能亢进症应首选 I^{131} 放射治疗或药物治疗，以尽快控制甲亢病情。双膦酸盐类骨吸收抑制剂能够有效缓解骨骼疼痛、控制骨骼病变的进展。

C09 低血磷性佝偻病/骨软化症患者

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目的 比较低血磷性佝偻病/骨软化症（hypophosphatemic rickets/osteomalacia, HR/OM）患者磷负荷前后血磷、甲状旁腺激素水平变化情况与正常人的异同。

对象与方法 1.研究对象：14 例 HR/OM 患者纳入低磷组， 8 名健康志愿者纳入对照组；2.研究方法：对受试者行 1.5g 中性磷负荷试验，分别于服磷前及服磷后 30、60、90、150、210 分采血测定血磷（Pi）及全段甲状旁腺激素（iPTH）水平。计算 210 分尿 Pi 排量。比较两组服磷前后血 Pi、iPTH 的变化情况有无异同；3.统计方法：对于重复测定数据采用重复测量数据方差分析进行统计学处理。数据采用 SPSS 统计软件（17.0 版）进行分析处理。

结果 1.服磷前基线情况：低磷组血 Pi 显著低于对照组（P<0.001），两组基础 iPTH 水平无显著性差异（P>0.05）；在低磷组 14 例患者中有 7 例 iPTH 处于正常范围（正常 iPTH 低磷亚组），另 7 例 iPTH 高于正常（高 iPTH 低磷亚组）。2.磷负荷前后血 Pi 变化：两组受试者在磷负荷后均见血 Pi 水平显著升高，但低磷组服磷后血 Pi 水平仍低于正常范围或处于正常低限水平；3.磷负荷前后血 iPTH 变化：低磷组在磷负荷后 30 分至 150 分的血 iPTH 水平均显著高于基线水平，对照组仅在磷负荷后 30 分钟显著高于基线水平。低磷组中，高 iPTH 低磷亚组在磷负荷后各时间点 iPTH 水平未见进一步升高；正常 iPTH 低磷亚组在磷负荷后各时间点 iPTH 水平较服磷前均显著升高（P 均<0.05）；4.血 Pi、iCa 与 iPTH 的相关性：服磷前 8 例有空腹 iCa 测定值的低磷组患者 iCa 与 iPTH 呈负相关；对照组与低磷组基础血 Pi 与 iPTH 水平均不相关。

结论 HR/OM 患者服磷后血 Pi 升高模式与正常人类似，但升高幅度较小。患者空腹血 iPTH 水平存在明显不均一性，部分患者显著升高。相对于正常人，患者服磷后 iPTH 水平呈持续、显著、总体高于正常范围的升高。此种表现在服磷前 iPTH 处于正常范围的患者中尤为明显。患者空腹 iPTH 的升高可能与潜在的低钙有关。

C10 FGFR1 对破骨细胞分化成熟与骨吸收功能的直接调控作用及机制研究

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目的 破骨细胞的分化和激活是一个复杂的多级调控过程，许多分子可通过破骨细胞膜上受体直接调控破骨细胞的分化和骨吸收活性。成纤维生长因子受体 1（Fibroblast Growth Factor 1，FGFR1）是破骨细胞主要表达的 FGFRs，有研究 FGFR1 可能参与了破骨细胞功能的直接调控，但缺乏直接证据。本研究旨在明确 FGFR1 对破骨细胞的直接调控作用，并初步阐明其作用机制。

方法 利用 *Fgfr1f/f* 基因工程小鼠和 Lyzs-Cre 基因工程小鼠得到在破骨谱系细胞条件性 Fgfr1 敲除的小鼠，以同窝同性别的 *Fgfr1f/f* 小鼠作为对照。贴壁法分离 6 周龄雄性敲除小鼠和同窝对照小鼠的骨髓单核细胞，利用激活核因子 NF-κB 受体的配体(RANKL)和巨噬细胞集落刺激因子（M-CSF）进行诱导。8 天后提取细胞总蛋白，Western blot 检测 FGFR1 的表达水平。细胞诱导 5 天、8 天、14 天后以抗酒石酸酸性磷酸酶（TRAP）染色细胞片并计数 TRAP(+)多核细胞数量，1%甲苯胺蓝染色预铺的牛皮质骨片后 IPP 软件测量骨吸收陷窝面积来观察诱导后破骨细胞的分化和骨吸收活性。提取诱导培养 8 天的破骨细胞总 RNA 和总蛋白。Real-Time PCR 检测 TRAP、基质金属蛋白酶-9(MMP-9)、组织蛋白酶 K (Cathepsin K）的表达水平。Western blot 检测 MAPK 信号通路分子(包括 p38、Erk 和 JNK)活化水平。

结果 与对照小鼠相比较，敲除小鼠骨髓单核细胞体外诱导 8 天后 Fgfr1 蛋白表达下调 64%。TRAP 染色发现诱导 5 天、8 天时敲除小鼠的破骨细胞数量明显低于对照小鼠($P<0.05$)，且细胞面积小，铺展不佳。诱导 14 天，两组破骨细胞均出现凋亡现象，破骨细胞数量减少。诱导第 5 天开始敲除组破骨细胞所形成的骨吸收陷窝面积明显小于对照组($P<0.05$)。随着培养时间的延长，两组实验骨吸收面积均明显增加，但敲除组破骨细胞吸收面积始终低于对照组。敲除 *Fgfr1* 的破骨细胞中 TRAP 和 MMP-9 的表达显著下调($P<0.05$)，Cathepsin K 与对照比较无明显差异。Erk 总蛋白的表达水平和 p38 激酶的磷酸化水平在两种基因型破骨细胞之间无显著差异，但 Erk 激酶磷酸化水平显著下降($P<0.05$)，在两种破骨细胞中均没有检测到 JNK 激酶的活性。

结论 FGFR1 通过上调破骨细胞中 Erk 激酶的活性及破骨细胞功能分子 TRAP 和 MMP-9 的表达来促进破骨细胞的分化及骨吸收活性。

C11 Ki-67、galectin-3 及 FHIT 在良恶性甲状旁腺肿瘤中表达差异的研究

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目的：原发性甲状旁腺功能亢进症(primary hyperparathyroidism，PHPT)病理类型分为腺瘤(adenoma，PA）、增生（hyperplasia，PH）和腺癌（carcinoma，PC）三种，目前从临床表现、生化指标及现有组织病理学方面难以对甲状旁腺良恶性病变进行早期鉴别诊断。本研究旨在通过对北京协和医院手术证实的 PC、PA 和 PH 组织进行 Ki-67、galectin-3 及 FHIT 的免疫组织化学研究，探讨其对甲状旁腺良恶性病变进行鉴别诊断的价值。

对象和方法：1992 年～2005 年手术并经病理证实的 PC（恶性）患者 15 例，以 19 例 PA、8 例 PH 为良性对照,采用免疫组织化学法测定 Ki-67、Galectin-3 及 FHIT 在甲状旁腺肿瘤中的表达，由病理科医师协助进行结果判断，在高倍视野下计数 100 个肿瘤细胞中免疫染色阳性细胞数，以百分数表示，作为连续变量进行统计；并绘制 ROC，确定 Ki-67 和 Galectin-3 的表达程度：（1）Ki-67 阳性细胞数<5%为低表达，5%以上为高表达。（2）Galectin-3 阳性细胞数 0%～24%为低表达，25%以上为高表达。

结果：在 PC、PA 及 PH 组织中，Ki-67 染色阳性细胞百分数中位数（第 25、75 百分位数）分别为 1.0%（1.0～15.0%）、1.0%（1.0～1.0%）和 1.0%（1.0～1.0%），P=0.032；Galectin-3 染色阳性细胞百分数中位数（第 25、75 百分位数）分别为 y；FHIT 表达在三组间无显著差异。将 PA 和 PH 组合并为良性病变组，恶性组中 Ki-67、Galectin-3 高表达的比例显著高于良性病变组，Ki-67 高表达对恶性甲状旁腺病变诊断的敏感性和特异性分别为 26.7%和 96.3%；Galectin-3 高表达对恶性甲状旁腺病变诊断的敏感性和特异性分别为 73.3%和 77.8%。将这两项指标联合，Ki-67 和 Galectin-3 高表达者诊断甲状旁腺癌的特异性为 100%，敏感性 20.0%；Ki-67 或 Galectin-3 高表达者诊断甲状旁腺癌敏感性为 80.0%，特异性为 74.1%。

结论：甲状旁腺腺癌组织中 Ki-67 和 Galectin-3 的表达显著高于腺瘤、增生组织，Ki-67 和 Galectin-3 的免疫组织化学染色可能有助于甲状旁腺良恶性病变的鉴别诊断。

C12 FGFR3 功能增强对小鼠破骨细胞作用的影响及机制研究

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目的 明确成纤维生长因子受体 3（Fibroblast Growth Factor 1，FGFR3）是否通过影响破骨细胞分化和骨吸收的作用进而影响软骨发育不全小鼠 $FGFR3^{G369C/+}$（FGFR3 功能增强型点突变小鼠）成年期骨重建，并初步阐明其机制。

方法 通过双能 X 线骨密度仪和 Micro CT 观察 4 月龄野生型和 $FGFR3^{G369C/+}$小鼠股骨骨骼变化。抗酒石酸酸性磷酸酶（TRAP）染色观察胫骨破骨细胞形成情况。利用激活核因子 NF-κB 受体的配体(RANKL)和巨噬细胞集落刺激因子（M-CSF）诱导分离的骨髓单核细胞。通过 TRAP 染色、骨吸收陷窝面积测量对比观察野生型和 $FGFR3^{G369C/+}$小鼠破骨细胞形成和骨吸收功能的差别。提取诱导培养 10 天的破骨细胞总 RNA 和总蛋白。定量 PCR 检测 FGFR3 的表达情况，以及破骨细胞相关基因 TRAP、基质金属蛋白酶-9(MMP-9)、组织蛋白酶 K (Cathepsin K）的表达水平，Western blot 检测细胞中 Erk1/2 磷酸化水平，明确 FGFR3 功能增强对该信号通路的影响。

结果 4 月龄 $FGFR3^{G369C/+}$小鼠较野生型小鼠骨密度下降，骨小梁体积、骨体积占组织体积百分比和骨小梁数目均明显降低，骨小梁分离度增加（$p<0.01$）。TRAP 染色发现 $FGFR3^{G369C/+}$小鼠胫骨生长板处破骨细胞数量增加，骨小梁表面吸收陷窝变深（$p<0.001$）。体外诱导骨髓单核细胞 10 天后两种基因型均有很多破骨细胞出现。但与野生型小鼠相比，$FGFR3^{G369C/+}$小鼠所形成的破骨细胞胞体偏大，数量也明显增多（$p<0.01$）。诱导 15 天后，$FGFR3^{G369C/+}$小鼠破骨细胞在骨片上形成的骨吸收陷窝深度与野生型差别不大，但骨吸收陷窝面积明显增大（$p<0.05$）。诱导 10 天后在两种基因型细胞中均检测到了 FGFR3 的表达。同野生型比较，$FGFR3^{G369C/+}$小鼠破骨细胞功能相关基因 TRAP、MMP9 mRNA 表达水平显著增高（$p<0.05$），Cathepsin K 无明显变化，磷酸化 Erk1/2 蛋白水平表达升高（$p<0.05$）。

结论 FGFR3 功能增强后激活 Erk1/2 信号通路，促进小鼠破骨细胞分化及骨吸收作用，导致成年期骨量减少。

C13 大剂量双膦酸盐的长期应用并未导致骨的过度矿化

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目的 双膦酸盐作为骨吸收抑制剂抑制了骨转化，增加骨结构单位(bone structure units,BSUs)的生命周期，延长了次级矿化的时间（secondary mineralization），使骨单位有更充足的时间进行矿盐沉积，从而增加了骨单位内矿盐的含量。但双膦酸盐的长期应用是否会导致骨的过度矿化，而损害骨的生物力学强度？本试验拟评估双磷酸盐的长期应用对骨单位次级矿化程度以及骨的生物力学特性的影响。
方法 30 只一岁龄猎犬按体重随机分成三组（每组雌雄各 5 只）：低剂量组和高剂量组犬分别每天给予口服因卡膦酸钠 incadronate 0.3mg/kg 和 0.6mg/kg,对照组犬给予口服乳糖 12mg/kg/d,所有犬持续给药三年。处死前进行四环素双标，处死后取左侧第九肋骨进行组织形态计测、生物力学测定和次级矿化程度评估。
结果 组织形态计测表明两个双膦酸盐治疗组的骨激活频率(Ac.f) 都明显低于对照组，分别降低了 40%和 82%。三个实验组肋骨的总面积和皮质骨面积没有明显的差异。低剂量和高剂量双膦酸盐组骨单位内的平均矿化程度（MDMB）都明显高于对照组，分别增加了 22%和 30%。
结论 双膦酸盐长期应用明显抑制了骨转换，增加了骨单位的矿化程度，但未导致过度矿化而损害骨的内在材料特性。

C14 散发和家族性畸形性骨炎 SQSTM1 基因突变分析

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研究目的 我们于 2002 年-2009 年根据临床表现、骨骼 X 线表现、血碱性磷酸酶或骨组织病理检查等，确诊散发性畸形性骨炎 8 例，1 个家族性畸形性骨炎（其中 3 例发病）。欧美国家研究发现 SQSTM1 是畸形性骨炎的致病基因，但是中国畸形性骨炎非常罕见，迄今只有 2 个家族性畸形性骨炎的报道。而 SQSTM1 是否是中国畸形性骨炎的致病基因不清楚，为此，本研究对 8 例散发性和 1 个家族性畸形性骨炎进行 SQSTM1 基因突变分析。
方法 8 例散发性畸形骨炎年龄为 51-82 岁，均为多骨性表现，血 ALP 水平显著升高；1 个家族性畸形性骨炎有 3 例发病，年龄为 54-66 岁，多部位骨骼受累，血 ALP 显著升高，获得该家族共 22 例基因组

DNA。对 SQSTM 基因所有外显子基因编码区进行了核苷酸序列检测，对获得的突变位点在 100 例对照人群中进行验证。

结果 1 个家族性畸形性骨炎所有患者没有发现存在 SQSTM1 基因突变；检测到 1 个散发性畸形性骨炎（上海人）存在 SQSTM1 基因错义突变，导致氨基酸序列改变。但其 1 个女儿、1 个妹妹和 1 个弟弟（均为健康）均不存在该基因突变。

结论 本研究首次提示 SQSTM1 也是中国散发性畸形性骨炎的致病基因，我们发现的 1 个家族性畸形性骨炎不是 SQSTM1 基因突变所致，可能存在其他未知基因突变，尚需进一步研究证实。

C15 骨硬化症临床特征和分子机制研究

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研究目的 骨硬化症是罕见代谢性骨病，是以高骨密度和容易骨折为特征。国内尚无发病率报告，国外报告发病率为十万分子五左右，发病的主要因素是遗传，已经发现一些致病基因，但是国内对于骨硬化症的遗传机制研究甚少。本研究目的：对 10 例骨硬化症进行临床特征分析，同时进行致病基因突变检测。

方法 根据患者症状、骨骼 X 线表现、双能 X 线骨密度检测、实验室生化检查等，排除继发性原因，确诊 10 例患者为骨硬化症，其中 2 例为常染色体显性遗传骨硬化症 I 型（ADO-I 型），其余为常染色体显性遗传骨硬化症 II 型 （ADO-II 型），4 例有家族史。提取上述患者和家庭成员共 80 例基因组 DNA，对可能的致病基因低脂密度相关蛋白 5（LRP5）、氯通道转运蛋白（CLCN7）、转化生长因子 bata1 (TGF-bata1)所有外显子基因编码区进行核苷酸序列测序。

结果 2 例 ADO-I 型患者没有发现上述基因突变；8 例 ADO-II 型患者均为 CLCN7 基因杂合突变，其中 3 例为 R767W 突变；骨硬化家庭成员携带 CLCN7 基因杂合突变，但没有发病。对 100 例健康人群上述突变位点的检测，均不存在。

结论 本研究是国内首次对骨硬化症遗传分析的报告，提示遗传是骨硬化症的主要发病因素，CLCN7 基因突变是中国骨硬化症（ADO-II 型）的常见发病原因，但有很高的外显不全性；临床确诊 ADO-II 型，应该进行 CLCN7 基因突变筛查。ADO-I 型致病基因尚未明确，期待获得更多病例开展遗传机制研究。

C16 Interferon-r(IFN-r) decreases TGF-b up-regulated CXCR4 expression in osteoclast precursors and suppresses cell migration to SDF-1

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Increased bone resorption occurs in inflammatory bone diseases such as rheumatoid arthritis and osteoclast precursors accumulate in bone resorptive sites. Directional migration and recruitment of osteoclast precursors from circulation to bone is a key step in osteoclastic bone resorption in inflammatory bone diseases. Our previous study indicates that TGF-b increased chemokine receptor CXCR4 expression and therefore, stimulated osteoclast precursor migration to chemokine SDF-1, a unique ligand of CXCR4. In rheumatoid arthritis, TGF-b levels increase locally in affected joints and accumulation of osteoclast precursors is followed by increased osteoclast formation, which causes the damage of joints. To decrease CXCR4 expression in osteoclast precursors can decrease local accumulation of osteoclast precursor and suppress bone damage by osteoclasts. IFN-r and TGF-β have many opposing effects on diverse cellular functions. IFN-r can induce Smad7 expression, which can inhibit TGF-b activated Smad2/Smad3 signal pathway.

Aims The present study is to test effect of IFN-r on TGF-b up-regulated CXCR4 expression in osteoclast precursors and cell migration to SDF-1.

Methods Mouse macrophage cell line RAW 264.7 was used as osteoclast precursors. Bone marrow cells from mouse were in incubated in a-MEM with M-CSF (25 ng/ml) for 48 hours as primary osteoclast precursors. Effects of TGF-b and IFN-r on CXCR4 expression in osteoclast precursors were measured by RT-PCR. Cell migration to SDF-1 in various conditions was studied using Transwell. The signal transduction pathway for CXCR4 expression regulated by TGF-b and IFN-r was studied by incubation of the cells with TGF-b and IFN-r. Phosphorylation of Samd2 was studied using Western blot.

Results 1. TGF-b up-regulated CXCR4 in osteoclast precursors by phosphorylation of Smad2 and Samd3 inhibitor SB 431542 suppressed TGF-b up-regulated CXCR4 expression in osteoclast precursors. It has been reported that phosphorylation of Smad2 and formation of Smad2/Smad3 complex is a classic signal pathway of TGF-b.2. IFN-r decreased TGF-b up-regulated CXCR4 expression in osteoclast precursors and also suppressed Samd2 phosphorylation induced by TGF-b, and therefore, counteract the TGF-b effect.3. Inhibitory effect of IFN-r on TGF-b stimulated CXCR4 expression resulted in decreased migration of osteoclast precursors to SDF-1 stimulated by TGF-b.

Conclusion The present study suggests that IFN-r decreases TGF-b up-regulated CXCR4 expression in osteoclast precursors by suppressing phosphorylation of Smad2, and therefore inhibited migration of osteoclast precursors to SDF-1. This study may provide new strategies in

prevention and treatment of bone damage in inflammatory bone diseases.

C17 不同氧浓度对骨髓基质细胞向成骨细胞分化影响的实验研究

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目的 观察不同低氧环境（3%、6%、10%、20%）对在向成骨细胞分化培养系中的骨髓基质细胞核心结合因子 α1（Cbfα1/Runx2）、 骨形态发生蛋白 2（BMP2）和过氧化物增殖活化受体 γ2（PPAR-γ2）表达的影响，探讨低氧环境对成骨细胞生成的影响。

方法 取 4 月龄雌性 SD 大鼠骨髓基质细胞在生长培养基中培养传代后，随机分成 4 组，每组样本数为 8,在无血清培养基中培养 24 小时,然后加入含 10mmol/L β-甘油磷酸纳、10^{-7}mmol/L 地塞米松和 50mg/ml 维生素 C 的分化培养基，分别将细胞放入 4 个不同氧浓度中继续培养，3 天后进行下面的实验：异硫氰酸胍-酚-氯仿一步法提取细胞总 RNA，用半定量逆转录 PCR（RT-PCR）检测（Cbfα1/Runx2）、BMP2 和 PPARγ2mRNA 的表达；用 western blot 检测（Cbfα1/Runx2）、BMP2 蛋白的表达。选择 ALP 和 I 型胶原做为成骨细胞分化成熟的标志。ALP 用化学酶法测定，I 型胶原用 Von Gieson 染色法来显示。

结果 1、与常氧组(20%)相比，各低氧组 Runx2mRNA 的表达明显增加，分别从 0.275±0.006 增加到 0.508±0.004、0.623±0.009、0.983±0.00.（P＜0.01）。Runx2 蛋白表达与 Runx2mRNA 的表达结果相似，低氧可促进 Runx2 蛋白表达，分别从 0.457±0.018 增加到 0.567±0.028、0.648±0.026、0.766±0.020（P＜0.01）。2、与常氧组(20%)相比，各低氧组 BMP2mRNA 的表达明显增加，分别从 0.632±0.006 增加到 1.015±0.006、1.812±0.006、2.075±0.007（P＜0.01）。低氧可促进 BMP2 蛋白的表达，与常氧组相比，各低氧组表达明显增加，分别从 0.524±0.013 增加到 0.635±0.018、0.765±0.001、0.879±0.025（P＜0.01）。3、与常氧组(20%)相比，各低氧组 PPARγ2mRNA 的表达明显降低，分别从 0.0677±0.007 下降到 0.543±0.006、0.493±0.004、0.404±0.002（P＜0.01）。

结论 低氧能明显促进 Runx2mRNA、BMP2mRNA 和 Runx2 蛋白的表达,且氧浓度越低,Runx2mRNA、BMP2mRNA 和 Runx2 蛋白表达越多，相反，低氧能明显抑制骨髓基质细胞 PPARγ2mRNA 的表达，且氧浓度越低，PPARγ2mRNA 的表达越低，表明低氧明显抑制骨髓基质细胞向脂肪细胞分化而促进其向成骨细胞分化。

C18 阿仑膦酸钠治疗男性原发性骨质疏松症临床研究

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目的 前瞻性观察骨吸收抑制剂阿仑膦酸钠对男性原发性骨质疏松症患者骨密度和骨转换生化指标的影响。

方法 纳入２００５年1月至２００７年1月北京协和医院诊断的２０例男性原发性骨质疏松症患者，以２０名正常男性为对照。骨质疏松症患者每周服用阿仑膦酸钠７０ｍｇ，且每日服用钙尔奇Ｄ１片，疗程为１８个月。每6个月采用双能Ｘ线骨密度仪测量腰椎和股骨近段骨密度，每3个月测量骨形成指标碱性磷酸酶和骨吸收指标Ⅰ型胶原羧基末端肽。正常男性不予干预，研究开始时和１８个月时检查腰椎和股骨近端骨密度。

结果 骨质疏松症组治疗前骨密度明显低于正常对照组。阿仑膦酸钠组治疗１８个月时，与治疗前比较，腰椎、股骨颈、大转子、全髋和股骨干骨密度值增加６．３％、２．５％、５．８％、３．５％及４．２％（Ｐ均＜０．０５）。骨转换生化指标碱性磷酸酶（ＡＬＰ）和ＣＴＸ水平治疗6个月时即显著下降，此后维持在较低水平，治疗１８个月后ＡＬＰ降低３３．６％，ＣＴＸ下降６６．７％（Ｐ均＜０．０１），骨吸收指标较骨形成指标下降更明显。患者对阿仑膦酸钠的耐受性良好。正常对照组骨密度和血ＡＬＰ治疗前后无明显变化。

结论 与对女性骨质疏松症患者疗效相似，阿仑膦酸钠能够明显增加男性原发性骨质疏松症患者的骨密度、降低骨转换生化指标，且安全性良好。

关键词：阿仑膦酸钠；男性骨质疏松症；骨密度；骨转换生化指标

・Poster

P01 Bone recovery status after reduction of cadmium exposure in male rats

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Aims To investigate the bone status after reduction of cadmium exposure in male rats.

Methods A number of twenty-four 8-week-old Sprague-Dawley male rats weighing 180-200g were randomly divided into 3 groups of 8 rats. Rats in the control group were injected subcutaneously with sodium chloride. The other two groups were given CdCl2 by subcutaneous injection at the doses of 0.5 mg Cd/kg body weight, up to 2 months (Cd+2m) and 3 months (Cd+3m) five time per week, respectively. At second months, blood was withdrawn from heart in EDTA-2k tube for Cd+2m and control rats, and urine samples for 24h were collected in each vessel. Before sacrifice, microCT scan was performed on the proximal tibia for bone morphometry and urine was collected from all of rats as at 2 months. At third month, all of rats were sacrificed by anesthesia and blood was collected from carotid in EDTA-2k tube; lumbar spine (L1-L5) was collected for bone mineral density measurement (BMD); right femur and L5 were collected for biomechanical test. Right tibia and L3 was used for bone histology. The samples of urine and blood collected at second month and third month were adopted for cadmium analysis.

Results The cadmium concentrations in blood and urine of rats injected with CdCl2 were both significantly higher than that injected with sodium chloride both at second and third month. The cadmium concentration in blood and urine of rats exposed to cadmium for 2 months was significantly lower than that exposed for 3 months. The BMD of rats injected with cadmium was obviously lower than that injected with sodium chloride ($p < 0.05$), but there is no significant difference between Cd+2m and Cd+3m. In Cd+2m and Cd+3m group, biomechanical parameters were significantly lower than those of the control group ($p < 0.01$), but there was no significant difference between Cd+2m and Cd+3m groups. MicroCT analysis showed that bone volume fraction, trabecular number, trabecular spacing, apparent BMD of Cd+2m and Cd+3m groups were significant lower compared to that of control group ($p < 0.01$). Goldner'strichrome and hematoxylin and eosin stain also reveals that the number of trabecular of Cd+2m and Cd+3m groups were decreased and trabecular spacing increased compared to that of control group. However, no significant difference was found between Cd+2m and Cd+3m.

Conclusion Effects of cadmium on bone persisted even after the reduction of exposure, including the effects on bone mass and bone micro-architecture. Cadmium damage to bone can not be reversed at short-term time.

P02 Evaluation of the Local Buckling Strength provided by the Trabecular Bone to the Proximal Femur in the Fall Mode

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AIMS Aging and osteoporosis cause thinning cortices, expansion of outer diameter and loss of internal trabecular support which may lead to local buckling, a different form of instability. In our previous work, we performed the stability analysis of only the femoral neck's cortex. In this study, we performed a series of stability analyses on tubular structures simulating femoral neck cortex as well as trabecular bone geometries using observed dimensions from elderly fracture controls. The ultimate goal is to make the simulations more realistic by considering bone's structural properties in greater detail.

METHODS We generated three dimensional models of the femoral neck using dimensions from studies of three non-fractured controls with patient numbers #98079, #99048, #98116 (57 year female, 68 male and 63 year old male respectively). Narrowest cross-section along the femoral neck was selected from each patient for FSM analysis. To evaluate the contribution of trabecular bone to buckling strength of femoral neck, we developed Finite Strip models of each cross-section with cortex only and with both cortex and trabecular core and compared the elastic local buckling stress between them.

RESULTS Using these models for each specimen, the consequence of a fall on the greater trochanter was evaluated. The Finite Strip Method (FSM) was used to investigate the association between local buckling at the femoral neck and the load to failure strength under physiologic loads. It was observed that the trabecular core contributed to a considerable increase in both the local elastic buckling load and predicted failure loads in all three patients. The trabecular bone contributed to significant increase in the predicted failure load in one patient (#98116). It has to be noted that the strength contribution to other patients (#98079, #99048) was also considerable.

CONCLUSIONS In our current study, we evaluate the contribution of trabecular bone to the predicted failure load of the femoral neck section. It has to be noted that the contribution of trabecular bone to both the local buckling strength and predicted strength in the female patient (#98079) are

lower compared to those of the male patients, although she is younger than them. It is possible that the trabecular bone's contribution in men and women may be different in general. In summary, inclusion of trabecular bone in the FSM analysis gives evidence of the increase in the overall strength of femoral neck in the fall mode

P03 Hip Periprosthetic Fracture Treated by Systemic Administration of Recombinant Human Parathyroid Hormone (PTH 1-34)

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Aims Clinical experiences on the use of Teriparatide (PTH 1-34) have shown increases in bone mass in osteoporotic men and postmenopausal women. There are increasing reports on humans' fracture healing. we sought to report our finings in periprosthetic fracture.

Methods The first one is an 88 years old man, who was referred for left hip periprosthetic fracture after a twist and revision operation had been proposed. The second patient is a 92 year old female; she developed left periprosthetic fracture after a twist injury. Teriparatide were prescribed for them with sufficient calcium supply.

Results The fractures got complete union and pain free three months after Teriparatide usage. Both patients also described significant backache improvement, which bothered them long before periprosthetic fractures.

Conclusions In 2004, Teriparatide (Forteo) was approved for treating severe osteoporosis by Bureau of National Health Insurance of Taiwan. Most clinical experiences focus upon hip or multi-level vertebral fractures. The back pain relief effect has been report on vertebral fracture patients treated with Teriparatide. To our knowledge, this is the first report about enhanced periprosthetic fracture healing and pain improvement beside fracture site. Although these scenarios were encouraging, the potential use of Forteo to enhance human fracture-healing should be formally tested in the clinical setting

P04 The relationship between fat and bone

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BcakgrounOverweight is known to protect to develop the osteoporosis. But recent a few study

present that increasing fat mass in the body composition have a negative correlation with bone mineral content. Several reporters suggested that bone marrow fats can induce bone loss. But there are discordant relation between bone marrow fat and Bone mineral content in some population study.

PurposThe aim of this study is to determine the relations with BMD, body compositions, and bone marrow fat.

Methods We reviewed 200 female women undergoing the 3D-QCT. First & second lumbar spine BMD and Visceral & subcutaneous fat, paravertebral muscle area by 3D-QCT were measured. And the mean & SD value of region of interest in the lumbar trabecular area and liver were measured. We considered that SD value represented fat content of bone marrow and ROI of Liver also represented the degrees of fatty liver. All ROI values were corrected by the value of phantom's ROI values.

Result Mean BMD showed the negative correlations with Age($r=-0.504$, $p<0.001$), visceral fat($r=-0.146$, $p=0.037$) and positive correlation with paravertebral muscle($r=0.212$, $p=0.002$). Bone marrow fat density (SD value of ROI) was associated with visceral fat($r=0.306$, $p<0.001$) and paravertebral muscle($r=-0.154$, $p=0.027$), liver ROI($r=-0.169$, $p=0.02$) but unrelated wit age and BMD. Visceral fat had each correlation with BMD($r=-0.146$, $p=0.037$) and Bone marrow fat density($r=0.306$, $p<0.001$), liver ROI($r=-0.391$, $p<0.001$) but BDM and Bone marrow fat failed to show the correlation.

Conclusion Visceral fat contents are associated with both BMD and bone marrow fat content. Lumbar trabecular BMD is more influenced by paravertebral muscle than visceral adipose tissue. But Bone marrow fats have no association with BMD. It means that each visceral fat's associations with BMD and bone marrow fats are depend on differences mechanisms. And bone marrow fat may have no direct effects on bone mineral density.

P05 Aortic calcification, vBMD and Vertebral fracture in Asian women : Measured by QCT

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Backgrounds Osteoporosis, osteoporotic fracture and vascular calcification are common age-related processes. However, there is no specific studies assessed the relationship between spinal volumetric BMD (vBMD) and abdominal aortic calcification score (ACS) computed by Quantitative computed tomography (QCT) in Asian women. The aim of this study is to investigate relationship between QCT measures spinal BMD and aortic calcification and spinal fracture in Asian women.

Methods A total of 402 patients were included in this study. All patients underwent QCT of the spine and hip to define vBMD and abdominal aorta calcification. QCT scans abdominal aorta from L1 level

of spine to L4 level as non-contrast abdominal pelvic CT scan does. We define the presence of AAC when only calcification is shown at least two slices of CT scan consecutively, plaque area is more than 1mm^2 with a density of greater than or equal to 130 Hounsfield units (HU). Then, AAC was quantified with the Agatston scoring method. Hypertension (HTN) and hypercholesterolemia are based on medical records. Spinal fracture is defined by lumbar spine radiography in QCT. Diabetes mellitus (DM) was defined as patients fasting plasma glucose of 126 mg/dL or higher or self-reported use of anti-diabetic medications.

Results Among 402 women subjects, 183 patients (45%) had osteoporosis, 63 patients (16%) had at least one vertebral fracture, 237 patients (60%) were found to have AAC in QCT. Quantified ACS measure by Agatston scoring method was inversely correlated with vertebral vBMD ($p<0.001$) but not after age adjustment. High ACS was directly related to high prevalence of spinal fractures. Multivariate logistic regression analysis showed that age, history of HTN, history of osteoporosis treatment, spinal vBMD, Femur neck BMD, trochanter BMD, ACS independently associated with spinal fracture with statistical significance but Total Hip BMD had not (OR 0.96, $p=0.08$). We divided subjects into 3 different groups based on their ACS (ACS = 0, 160 ACS 0 or ACS >160). After adjustment of age, body mass index (BMI), vBMD at spine, femur neck, trochanter, comorbidity and history of osteoporosis treatment, patients with ACS >160 had more than 3 fold increased risk of spinal fracture. (OR 3.219-3.578; $P < 0.05$ according to the site)

Conclusion Our findings support an age-dependent association between AAC and vBMD. We also found ACS is strong predictor for spinal osteoporotic fracture in Asian women regardless of age, BMI, BMD, comorbidties and other confounding factors.

P06 The Effects of 3-year Hormone therapy, Raloxifene and Alendronate on Serum Lipid Profile, Body Mass Index and Mammographic Change in Postmenopausal Women

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Objectives: To evaluate the effects of 3-year hormone therapy, raloxifene and alendronate on lipid profile, body mass index (BMI) and mammographic change in Korean postmenopausal women.

Methods: We studied 107 postmenopausal women who had visited the Department of Obstetrics and Gynecology of Inje University Sanggye Paik Hospital between January 2000 and June 2008. These patients were divided into alendronate (n=21), raloxifene (n=18), estrogen therapy (ET) (n=35), estrogen-progesterone therapy (EPT) (n=33) group. Serum lipid profile was measured at baseline and 1, 2, 3-years after treatment. Mammographic change and BMI were also assessed at baseline

and 3-years after treatment.

Results: Total cholesterol level was decreased significantly after 3 years of treatment in EPT group by 5.0% and raloxifene group by 8.7%. Triglyceride level was decreased significantly after 3 years in alendronate group by 12%. HDL-cholesterol level was increased significantly after 2 years in ET group by 12% and EPT group by 6.0%. LDL-cholesterol level was decreased significantly after 1 year in ET group by 7.0% and EPT group by 13%. In raloxifene group, LDL-cholesterol level was decreased significantly after 3 years by 7%.The percentages of mammographic changes including new formation of solid mass and cyst were not significantly different among four groups. Breast cancer was not detected during the 3 years. BMI was not changed significantly after 3 years in all four groups.

Conclusion : In postmenopausal women, the treatment with hormone therapy or raloxifen has a beneficial effect on lipid profiles. BMI was not changed. Hormone therapy does not increase breast cancer risk for 3 years in this study. Longer-term exposure and follow-up data are needed.

P07 Visceral Adiposity Measured by Computed Tomography Is Inversely Related to Bone Mineral Density after Adjusting for Confounders

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Obesity or overweight has long been thought to protect against osteoporosis. However, recent studies showed that after controlling for body weight, obesity was inversely correlated with bone mineral density (BMD), and also associated with higher risk for fractures. However, no study reported the relation between BMD and adiposity directly measured by computed tomography (CT). In addition, it is unknown whether there is fat depot specific difference in the relation. The objective of the study was to investigate the relation between visceral or subcutaneous adiposity measured by CT and BMD, and also identify the metabolic factors associated with BMD. We studied 461 subjects (295 males and 166 females) aged 21-83 years. Multivariate regression analyses were conducted to examine the cross-sectional associations between body composition-related or metabolic parameters and BMD. After adjusting for body weight and other confounders, visceral fat area has inverse association with BMD in men (β=-0.133, P=0.049 for lumbar spine; β=-0.135, P=0.04 for femur neck; β=-0.179, P=0.005 for total hip) and women (β=-0.424, P<0.001 for lumbar spine; β=-0.302, P=0.005 for femur neck; β=-0.274, P=0.01 for total hip). However, subcutaneous fat area showed no significant relationship with BMD at most sites. In men, HDL cholesterol was positively associated with BMD

(*β*=0.131, *P*=0.02 for lumbar spine; *β*=0.140, *P*=0.01 for femur neck; *β*=0.170, *P*=0.002 for total hip), while LDL cholesterol was negatively associated with BMD (*β*=-0.197, *P*=0.002 for lumbar spine; *β*=-0.142, *P*=0.02 for femur neck). In women, total and LDL cholesterol were negatively associated with BMD at lumbar spine (*β*=-0.237, *P*=0.001 and *β*=-0.247, *P*=0.001 respectively). We conclude that visceral adiposity is inversely associated with BMD in both sexes after adjusting for confounders and that metabolic factors such as HDL and LDL cholesterol may contribute to this inverse relation in part.

P08 Studies on the detecting rate of osteoporosis by peripheral bone densitometry in females

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Aims To study the suitable criterion for diagnosing osteoporosis for Chinese postmenopausal women by peripheral bone densitometry and look for the scientific basis for prevention and management of osteoporosis.

Methods A total of 274 healthy females aged 45 – 79 years were recruited to participate in the measurement of forearm bone mineral density byperipheral dual - energy X - ray absorptiometry (pDEXA) , and all subjects completed a questionnaire to obtain information on lifestyle. The scan sites included distal (area of minimum BMD in the distal radius + ulna), proximal (1/3 site or proximal radius + ulna) and both. And values were expressed as BMD (Bone Mineral Density, g/cm2).

Results Forearm BMD value for each scan site are in line with the normal distribution and can be represented as mean ± standard deviation. The distal and proximal forearm BMD in different scan site in females decreased with age significantly. The detecting rate of osteoporosis at different sites was not the same and it was considerably higher at he distal radial and ulna (Dist. R+U BMD) than that at the proximal radial and ulna (Prox. R+U BMD) and proximal ulna (Prox. R BMD). In women over 50 years old, the BMD value decreased significantly with age, and the cumulative decreasing rate of bone mineral density for the distal radial and ulna (Dist. R+U BMD) reached 11.8% in women before 55 years old, and increased to the level of 22.7% within 55-59 years old. If 2.0SD and 2.5SD below the peak BMD are regarded as the diagnostic criterion of osteoporosis, the prevalence rate of osteoporosis reached 50% and 30.9% in women within 55-59 years old, respectively. Meanwhile, in women over 60 years old, the prevalence of osteoporosis reached 56.8% and 45.5%,respectively.So if the cutoff value of PBM minus 2.0SD was used as diagnostic criterion of osteoporosis, the age of

women with osteoporosis would lie within 60-65 years old, which was coincidence with physiology of bone metabolism in postmenopausal women.

Conclusions If the sensitive site such as the distal radius + ulna by peripheral bone densitometry was selected as measurement site, the criterion of 2.0SD below the peak bone mass for diagnosing osteoporosis is suitable for Chinese postmenopausal women, and it was the 80% value of criterion recommended by WHO.

P09 Establishment of peak bone mass and lifestyle determinants of forearm bone mineral density in females

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Aims To establish the peak bone mass and standard deviation of highly responsive region of interest in the forearm and analyze the possible lifestyle determinants of bone mineral density in females of Shanghai.

Methods A total of 365 healthy females aged 21 – 59 years were recruited to participate in the measurement of forearm bone mineral density byperipheral dual - energy X - ray absorptiometry (pDEXA) , and all subjects completed a questionnaire to obtain information on lifestyle. The scan sites include distal (area of minimum BMD in the distal radius + ulna), proximal (1/3 site or proximal radius + ulna) and both. And values were expressed as BMD (Bone Mineral Density, g/cm2).

Results Forearm BMD value for each scan site are in line with the normal distribution and can be represented as mean ± standard deviation. The distal and proximal forearm BMD in different scan site in females increased with age before age 45, and reached the peak value at age 40-44, then decreased gradually. The peak BMD value represented as mean ± standard deviation for the distal radial and ulna (Dist. R+U BMD), the proximal radial and ulna (Prox. R+U BMD), and proximal ulna (Prox. R BMD) were 0.3717±0.0423 g/cm2、0.7958±0.0771 g/cm2 and 0.7802±0.0671 g/cm2, respectively. Meanwhile, body weight and number of pregnancies were identified as significant predictors of peak bone mass, low body weight and excessive numbers of pregnancies were the major risk factors for low peak bone density.

Conclusions Establishing the device-specific cut-points for peripheral BMD measurement would be useful to supply the basis data for the study of osteoporosis, such as screening patients for selection to central DXA testing, or identify individuals who might benefit from pharmacological intervention.

P10 Effects of Different Health Education Programs on Postmenopausal Women's Knowledge, Health-belief and Behaviors of Osteoporosis in Community

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Background The incidence of osteoporosis among postmenopausal women was high. Evidence demonstrated that increasing dietary calcium (Ca) intake and weight-bearing physical activity (WBPA) can decrease bone loss in postmenopausal women. But dietary Ca intake in many postmenopausal women is far below the recommended daily allowance, They also participate less frequently in physical activity. And recently there are lack of an efficient education program to increase dietary Ca intake and WBPA .

Objective To evaluate and compare the effects of two kinds of education programs.

Methods A quasi-experimental study was used in this study. Conveniently selected two community sites in Beijing Dongcheng district. There were seventy subjects in the study which was divided into two groups, group 1 was given general health education,group 2 was given general health education and tailored intervention. General health education included two lectures and health education manual. Tailored intervention consisted of interpretation of bone mineral density testing results,one face to face guidance according to participants' daily calcium intake and exercise level and one telephone guidance. Data were collected at four points: before and after general health education, first month and third month after general health education.The outcome measures included: knowledge of osteoporosis, health belief of osteoporosis, self-efficacy of osteoporosis, daily dietary Ca intake and hours of WBPA per day.

Results Sixty-five subjects completed data collection procedures, 33 subjects in group 1and 32 subjects in group 2. Compared with baseline data, the knowledge score, self-efficacy and daily dietary Ca intake of two groups increased significantly($P<0.05$), but there was no significant effect on health belief and WBPA per day about osteoporosis after general health education.One month after general health education, all the other index in group1 didn't show significant difference($P>0.05$) compared with baseline data, except the knowledge score and self-efficacy, but all the index in group2 increased significantly; Compared between these two groups, all the index of group2 were higher than group 1($P<0.05$).Three month after general health education, all the other index in group1 didn't show significant difference（$P>0.05$) compared with baseline data except the knowledge score,

but all the other index in group 2 increased significantly(P<0.05) except WBPA per day, Compared between these two groups, all the other index of group 2 were higher than group 2 (P<0.05) except health belief and WBPA per day.

Conclusions The effects of general health education and tailored intervention is better than general health education including knowledge of osteoporosis, health belief of osteoporosis, self-efficacy of osteoporosis, daily dietary Ca intake and hours of WBPA per day .

P11 A Case with Subtrochanteric Fracture after Short-termed Intravenous Bisphosphonate therapy

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Objectives Pamidronate and zoledronic acid are two potent intravenous bisphosphonates used in the treatment of breast cancer as well as osteoporosis. While the concern for heightened fracture risk in a patient on long-term bisphosphonate treatment for malignancy has been previously noted, we present one case of spontaneous, nonspinal fractures in a patient undergoing short-term bisphosphonate treatment for breast cancer.

Methods A 57-year-old woman with a 3-year history of breast cancer treated with Taxol for 2 years, pamidronate (90 mg IV every month) for 2 years, and zoledronic acid (4 mg IV every month) for another 1 year presented with spontaneous pain in her left thigh. On examination, she was neurovascularly intact and had pain at extremes of all ranges of motion. Her sensation was grossly intact. Plain radiographs of the left hip demonstrated a subtrochanteric fracture arising from a stress fracture.

Results She was treated with ORIF with a gamma nail. Microscopic evaluation of A: the great trochanter, B: fracture area, C: subtrochanter area, and D: femoral shaft demonstrated that section D showed the fragmented bone tissue and some fibrinous exudates and hemorrhage, and consistent with fracture, and other sections revealed fragmented bone tissue with fibrinous exudates, there is no osteoclast activity is seen, and no evidence of malignancy is seen. She had a full, uncomplicated postsurgical recovery and maintained complete control over her breast cancer while she dis-continued on her program of zoledronic acid therapy.

Conclusions Suppression of bone turnover and microdamage accumulation may play a role in the development of this fracture. Our findings suggested that even short-termed intravenous bisphosphonate will cause stress fracture of the femur. We emphasize the awareness and caution in

the use of zoledronic acid in patients with bony metastases.

P12 The Research of the Expressing of the Osteoporotic Fractures Model Rats with the Bone Densifying Method

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Purpose To test the BMP-3m RNA level produced by the bone densifying method in the process of healing castrated osteoporotic fractures model rats, using the Fluorescent Quantity RT-PCR.

Method Construct the animal model of the Wistar rats castrated osteoporotic fractures and the SYBR Green 1 Fluorescent Quantity RT-PCR method at BMP-3Mrna expressing level. Intercept the end organization in the second, the forth and the sixth week respectively after operation. Test the BMP-3m RNA level in the samoles by Fluorescent Quantity RT-PCR.

Results The rats bone organization BMP-3m RNA expressing level: The whole comparison in the time version tends to descend little by little and has notable differences (F=153.19 . P<0.05). The whole comparison in the group version is that the model group less than the experiment group less than the comparison group, and has notable differences (F=262.23 . P<0.05). The intersecting comparison between the time version and the group version also has notable differences (F=81.50 . P<0.05). The comparison between any two groups has statistics differences (P<0.05).

Conclusion The Chinese medicine bone densifying method can help to promote the healing of castrated osteoporotic fractures rats model.

P13 补肾化痰法影响骨髓间充质干细胞成脂和成骨分化的实验研究

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目的 研究补肾法、化痰法、补肾化痰法对 MSCs 成脂分化和成骨分化的影响，探讨补肾化痰法治疗骨质疏松症的可能作用机制。

方法 运用全骨髓贴壁法分离培养纯化 Wsitar 大鼠 MSCs，并从细胞形态学、流式细胞仪检测细胞表面抗原等角度进行鉴定。诱导 MSCs 成脂分化，观察补肾中药、化痰中药和补肾化痰中药分别对 MSCs 成脂分化后细胞形态学、油红 O 染色及定量和用 RT-PCR 检测脂蛋白脂酶（LPL）mRNA 表达的影响。诱

导 MSCs 成骨分化，观察补肾中药、化痰中药和补肾化痰中药分别对 MSCs 成骨分化后茜素红染色及定量、碱性磷酸酶（ALP）活性和骨钙素（OCN）mRNA 表达影响。

结果 采用全骨髓贴壁法可稳定获得均质性良好的大鼠 MSCs，流式细胞仪检测大鼠 MSCs 表面标志抗原 CD29、CD44 表达阳性，CD45 表达阴性；化痰中药能使 MSCs 诱导形成的脂肪细胞减少，经油红 O 定量检测，化痰中药组 MSCs 成脂诱导后的油红 O 定量较经典诱导组显著降低，差异具有统计学意义（P＜0.01），并下调成脂相关基因 LPL-mRNA 表达，与经典诱导组比较有显著性差异（P＜0.05）；补肾化痰中药能促进 MSCs 成骨诱导后细胞体外钙化，经茜素红 S 定量检测，补肾化痰中药组 MSCs 成骨诱导形成的钙结节茜素红染色定量值高于经典诱导组（P<0.05），补肾化痰中药组 MSCs 成骨诱导后 ALP 活性高于经典诱导组（P<0.01），补肾化痰中药组 MSCs 成骨诱导后 OCN-mRNA 表达均较经典诱导组升高（P＜0.01）。

结论 补肾化痰法治疗骨质疏松症的可能作用机制是：化痰法抑制 MSCs 向脂肪细胞分化，补肾化痰法促进 MSCs 向成骨细胞分化。

P14 淫羊藿苷、小檗碱和仙茅苷乙协同抑制破骨细胞性骨吸收的研究

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目的 研究淫羊藿苷、小檗碱和仙茅苷乙对破骨细胞性骨吸收的协同抑制作用。

方法 采用原代培养的成骨细胞和骨髓单核细胞联合培养的方法，在 1,25-$(OH)_2$Vitamin D_3和地塞米松作用下，使骨髓单核细胞分化形成破骨细胞。通过相差显微镜观察细胞形态，抗酒石酸酸性磷酸酶（Tartrate-resistantacidphosphatase，TRAP）染色和骨片上骨吸收陷窝的形成鉴定破骨细胞。磷酸苯二钠法测定破骨细胞抗酒石酸酸性磷酸酶的活性，计算机图像分析技术测定骨片上破骨性骨吸收陷窝的面积。激光共聚焦观察破骨细胞肌动蛋白环和细胞核的变化，实时定量 PCR 和 Western-blot 分析成骨细胞 OPG 和 RANKL 的 mRNA 和蛋白质的表达。以金氏公式计算各化合物间的相互作用。

结果 淫羊藿苷、小檗碱和仙茅苷乙及其组合物均能不同程度的减少 OC 的数量，淫羊藿苷和小檗碱组合后的 q 值为 1.11，淫羊藿苷和仙茅苷乙组合的 q 值为 0.91，小檗碱和仙茅苷乙组合 q 值为 0.98，淫羊藿苷、小檗碱和仙茅苷乙三者组合的 q 值范围是 1.07~1.18。淫羊藿苷、小檗碱和仙茅苷乙及其组合物均显著降低 TRAP 酶的活性，组合后，淫羊藿苷与仙茅苷乙之间可以产生一定的协同作用，三个化合物合用时对 TRAP 活性的抑制产生明显的协同作用，q 值介于 1.07~1.23 之间。淫羊藿苷、小檗碱和仙茅苷乙及其组合物对组织蛋白酶 K 具有显著的抑制作用，但组合后多为简单的相加作用，未产生明显的协同作用。淫羊藿苷、小檗碱和仙茅苷乙及其组合物均可显著减少破骨细胞在骨片上形成的吸收陷窝的数量和面积，淫羊藿苷与小檗碱组合 q 值为 1.11，淫羊藿苷与仙茅苷乙组合 q 值为 1.13，小檗碱与仙茅苷乙组合 q 值为 1.05，淫羊藿苷、小檗碱和仙茅苷乙三者组合 q 值范围是 1.13~1.17。淫

羊藿苷、小檗碱和仙茅苷乙及其组合物均对破骨细胞的肌动蛋白环和细胞核产生一定的影响，促进破骨细胞的凋亡。淫羊藿苷、小檗碱和仙茅苷乙及其组合物都能够使成骨细胞 OPG/RANKL 的比值上调，其中仙茅苷乙、淫羊藿苷+小檗碱、小檗碱+仙茅苷乙组作用后 OPG 的 mRNA 水平是 RANKL 的 2 倍左右；淫羊藿苷、小檗碱、淫羊藿苷+小檗碱+仙茅苷乙组作用后 OPG 的 mRNA 水平为 RANKL 的 10~20 倍；淫羊藿苷+仙茅苷乙两药联用组作用后使 OPG 的 mRNA 水平增长为 RANKL 的 80.44 倍。Western Blot 实验表明，各活性化合物及其组合作用 48h 后，OPG 与 RANKL 的蛋白表达比值水平都升高为对照组的 2~6 倍。

结论 淫羊藿苷、小檗碱和仙茅苷乙通过协同调控 OPG-RANKL 途径抑制破骨细胞性骨吸收。

P15 夹脊穴为主治疗绝经后骨质疏松症临床疼痛体会

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目的 绝经后骨质疏松症是一种中老年妇女常见的骨代谢疾病，主要由于雌激素缺乏，削弱了对成骨细胞的刺激和对破骨细胞的抑制，造成机体相对成骨减少及破骨增多所致。其病理特征为骨组织显微结构退化，是一种以背部慢性深部广泛性钝痛为主要表现，患者可有腰背酸痛或周身酸痛，负荷增加时疼痛加重或活动受限，严重时翻身、起坐及行走有困难。伴全身乏力等症状的慢性疾病，严重影响了中老年妇女的健康和生活质量。用夹脊穴为主治疗绝经后骨质疏松症临床疼痛，以探讨奇穴的针灸临床效应。

方法 取相应夹脊穴：胸部及上肢疼痛：T3-T9 节段夹脊穴；腰臀部及下肢疼痛：T11-L4 节段夹脊穴。辨证加减：肾阴虚者：加肾俞、太溪、三阴交、悬钟；肾阳虚者：加灸关元、命门、悬钟、足三里。随证加减：腰痛甚者：加肾俞、命门、志室、太溪；背痛甚者：加至阳、膏肓、肺俞、足三里；髋骨疼痛者：加关元、气海、命门；指关节僵硬、疼痛者：加合谷、足三里、阴陵泉。选 30 号 1.5 寸不锈钢毫针，向内斜刺 0.5-1 寸，得气后行重插轻提手法 1 分钟，待有麻胀感即停止进针，严格掌握进针的角度和深度。余穴常规操作。留针 30 分钟，其间行针 1 次后出针。每日 1 次，6 天为 1 个疗程，休息 1 天后继续下 1 个疗程，治疗 3 个疗程后统计疗效。

结果 显效 25 例，占 71.4%；有效 8 例，占 22.8%；无效 2 例，占 5.7%；总有效率 94.3%。

结论 骨质疏松的临床主证及发病机理属中医的“肾虚腰痛”、“肾精不足”、“骨痿”、“骨痹”、“骨枯”等范畴。肾虚是本病的关键。绝经后妇女由于肾气不足，肾精虚衰，冲任失调，精枯髓少，充养乏源，骨失所养，则骨体枯槁，无以作强，“不容则痛”，故腰膝酸软、行走不便；亦或肾阳不能温煦、气滞血凝，则发为骨痿或骨痛、骨痹。夹脊穴为主治疗绝经后骨质疏松症临床疼痛症，为标本兼治之法。夹脊穴为奇穴。内夹督脉，外临足太阳经，针灸夹脊穴通过督脉、督脉之络脉及足太

阳经协同发挥治疗作用。夹脊穴还分布于“标部”、“结部”、“气街”、“四海”的部位。是经气集中、毗邻脏腑、分属三焦的部位。易于激发经气，调理三焦气机和协调脏腑阴阳平衡。治标者，治其疼痛也；治本者，调节脏腑也。夹脊穴虽为奇穴，但内夹督脉、外邻背俞穴，深层有脏腑、位处躯干，是调节脏腑、平衡阴阳、补益气血、填充肾精之穴。

P16 链脲佐菌素诱导的糖尿病大鼠骨转换及其分子机制的研究

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目的 本研究拟通过测定大鼠血清骨转换标志物水平、骨形态计量学参数、骨力学指标反映 DM 大鼠骨量和骨转换变化情况，并检测大鼠骨组织中标志破骨活性的核因子-κB 受体激活物配基（RANKL）/护骨素（OPG） mRNA 水平和标志成骨细胞分化晚期的骨钙素（OC）
mRNA 水平，以及调控成骨细胞分化成熟的转录因子核结合因子 1（Cbfa1）、OSX mRNA 的表达水平，分析 DM 大鼠骨丢失的分子机制。在增龄和废用性骨质疏松时，骨组织中脂肪组织形成增加而成骨细胞生成或成熟减少导致骨丢失。

方法 20 只雄性 SD 大鼠，随机分为正常对照组（CON）、DM 组（DM）。以一次性静脉注射 STZ 的方法制造 DM 大鼠模型，成模 8 周后处死。留取血尿标本分别检测胰岛素、钙、磷、碱性磷酸酶、骨钙素和 24 小时尿钙。留取左侧胫骨近端 2/3，行骨形态计量学分析。分离右侧股骨和椎骨（L1-5），行骨密度测量和骨生物力学试验。分离右侧胫骨近端 1/3（去除骨骺），提取骨组织总 RNA，用实时荧光定量 RT-PCR 的方法检测大鼠骨组织中各因子 mRNA 的表达水平，分离左侧股骨近端 1/2，制做脱钙骨切片，计数骨髓中脂肪细胞数量。

结果 两组大鼠血钙、磷、碱性磷酸酶水平无显著差异。STZ 诱导的 DM 大鼠 24 小时尿量和尿钙显著增加，血清骨钙素水平减低，股骨和腰椎骨密度较正常对照组显著减低，骨计量形态学参数显示骨小梁骨量显著减低，动力学参数表明 DM 大鼠类骨质表面、骨表面激活频率、组织水平的骨形成速率显著减低，力学测试示 DM 大鼠骨力学性能减低。STZ 诱导的 DM 大鼠骨组织中标志骨吸收的 RANKL/OPGmRNA 水平和标志成骨细胞分化成熟晚期的 OC 以及调控成骨的转录因子 OSX、Cbfa1mRNA 水平显著减低，而标志脂肪细胞的 PPARγ$_2$mRNA 水平显著增加，骨髓脂肪细胞计数增加伴皮下、肝脏脂肪减少。

结论 STZ 诱导的 DM 大鼠骨形成速度减低造成骨量减少，骨力学性能下降。DM 大鼠骨组织中骨吸收和骨形成的各标志因子 mRNA 水平均下降，考虑为低转换型骨量丢失。同时，骨组织中标志脂肪细胞的 PPARγ$_2$mRNA 水平和骨髓脂肪细胞计数增加，而 DM 大鼠皮下、肝脏脂肪减少，提示这种脂肪转移机制可能也存在于 DM 大鼠骨丢失过程中。

P17 Intracellular iron promoted and bone mineralization elevated due to increased hepcidin by ferroportin1 in hFOB1.19 cells

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Aims To study the influence of hepcidin on bone metabolism of human fetal osteoblasts 1.19 cells.
Methods (1) Add double distilled water into the control group and hepcidin of different concentration into the experimental groups. A confocal laser scanning microscope was used to measure the green fluorescence;(2) Total RNA was isolated from hFOB1.19 cells using TRIZOL Reagent.RT-PCR of the mRNA was performed with a reverse transcription kit from Promega and Taq polymerase; (3) The influence of hepcidin on cell proliferation was evaluated by 3-(4,5-dimethylthiazol-2-yl) -2-5-diphenyltetrazolium bromide (MTT) assay;(4) Calcified nodules on the cells were demonstrated by von Kossa staining.
Results In this study,we observed that:①the fluorescence intensity of Fe3+ in hFOB 1.19 detected by CLSM increased significantly with the increase of Hepcidin(Hepcidin 0-100 nmol/L)②mRNA expression of ferroportin1 gene in the hFOB1.19 cells was detected using rt- PCR ③hepcidin had no effect on cell proliferation by using MTT assay ④hepcidin stimulation increased the formation of calcified nodules under Von Kossa stain testing.
Conclusions These findings indicate that ferroportin 1 was highly expressed with hepcidin input in hFOB1.19 cells, and it had crucial regulatory effect on increasing intracellular iron concentrations through hepcidin.

P18 Expression of RhoGDIα in rat osteoblasts Intermittently Exposed to Parathyroid Hormone in vitro and in vivo

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Aim To investigate the mechanism of bone-forming effect of intermittent parathyroid hormone(PTH) administration, and search for novel molecules of bone anabolism via PTH signaling pathway.
Methods Primary cultures of rat osteoblasts(ROBs) were divided into intermittently-PTH- treated group(Itm) and control group(Ctr). Imitating the pharmacokinetics of intermittent PTH administration *in vivo*, the ROBs in Itm group were exposed to PTH for 6h in an 24h incubation cycle, the ROBs in

Ctr group were exposed to vehicle for the entire incubation cycle. The cells were collected at 6h and 24h of the final cycle, and the differentially expressed proteins between Itm and Ctr group were analyzed by two-dimensional electrophoresis(2-DE) coupled with matrix assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI-TOF-MS). The most significantly changed proteins in vitro were validated by immunohistochemistry (IHC) in intermittently-PTH-treated rat model.

Results The proteomics analysis indicated that totally 15 differentially expressed proteins between Itm and Ctr group were successfully identified. Rho GDP-dissociation inhibitor**α** (RhoGDI**α**) and vimentin were changed most significantly in these proteins. Further studies by IHC showed that the expression of RhoGDI**α** in ROBs was significantly higher in PTH-treated sham-operated rats than vehicle-treated sham-operated rats, but the difference was not significant between PTH-treated and vehicle-treated OVX rats. Vimentin expression was not changed either in PTH-treated sham-operated rats or PTH-treatedOVX rats.

Conclusion Our research suggested that intermittent PTH treatment could induce the expression changes of many proteins in ROBs *in vitro*, and result in RhoGDI**α**up-regulation in ROBs both *in vitro* and *in vivo* if estrogen is present, this may be one of the mechanisms underlying the synergistic bone-forming effect of PTH in combination with estrogen.

P19 The Construction of bone-specific E11-containing plasmid and transgenic mouse model

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Aim E11 is an osteocyte-specific membrane protein in bone, its function is almost unknown. To further study the function of E11 in vivo and in vitro, E11-overexpressed transgenic mice and MLO-Y4 cell line were obtained by constructing osteocyte-specific eukaryotic expression vector pcDNA3.1-OG2-EGFP-E11.

Methods (1) DNA fragments of E11cDNA, OG2 promoter and EGFP were amplified by PCR, then recombinat expression vector pcDNA3.1-OG2-E11-EGFP was constructed by the method of gene clone and was validated by enzyme digestion and DNA sequencing. (2) The recombinant plasmid pcDNA3.1-OG2-E11-EGFP was transiently transfected into MLO-Y4 cells by Lipofectin, and the MLO-Y4 cells that were transfected with empty vector (pcDNA3.1 +) or non-transfected were set as controls. To obtain stable cell strain of E11 overexpression, G418(400ug/ml) was used for selection. Fluorescence microscope and western blotting were used to screen the transiently and stably

transfected MLO-Y4 cells. (3) Transgenic mice were generated by pronuclear injection of linearized DNA fragment, and transgenic mice were genotyped with the tail DNA.

Results (1) The sequence of recombinant expression vector pcDNA3.1-OG2-E11-EGFP was identical to its theoretical sequence. (2) The intensity and distribution of green fluorescence was better at 24h than those at 48h and 72h post-transfection. The western blotting showed that the expression level of E11 was significantly higher in cells which was transfected with pcDNA3.1-OG2-E11-EGFP than both controls. (3) 71 pups were obtained via pronuclear microinjection, among them, 13 were proved to carry OG2-E11 DNA sequence , and regarded as founder mice.

Conclusion Recombinant expression vector pcDNA3.1-OG2-E11-EGFP was constructed successfully. The MLO-Y4 cell line with stable E11 overexpression, and positive E11/EGFP transgenic mice were successfully obtained.

P20 吡格列酮对大鼠骨髓间充质干细胞向成骨细胞分化后转脂分化的影响

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目的 观察噻唑烷二酮药物吡格列酮对大鼠骨髓间充质干细胞（BMSCs)向成骨细胞分化后转脂分化的影响，探讨吡格列酮对骨代谢的影响和可能机制。

方法 采用体外细胞培养技术自大鼠股骨和胫骨分离和培养 BMSCs，取第四代细胞进行实验分组：5C（成骨诱导 5 天后转脂诱导)、5E（成骨诱导 5 天后转脂诱导同时加 1μg/ml 吡格列酮干预）、14C（成骨诱导 14 天后转脂诱导）、14E（成骨诱导 14 天后转脂诱导同时加 1μg/ml 吡格列酮干预）。各组分别转脂诱导 21 天。观察指标：①矿化结节形成（茜素红染色）；②细胞内脂滴形成（油红 O 染色）；③成骨分化标志物 Runx2 及 ALP mRNA 和成脂分化标志物 PPARγ mRNA 表达水平（RT-PCR）。

结果 茜素红染色显示 BMSCs 成骨诱导 5 天后未见矿化结节形成，14 天可见散在褐色点状矿化中心，未见明显红色矿化结节。转脂诱导后，5C,5E 组较 14C,14E 组较早可见脂滴形成，且脂肪细胞数目较多，脂滴较大；油红 O 染色显示 5E，14E 组分别较 5C、14C 组阳性细胞数目增多，脂滴变大，脂肪细胞体积亦增加。RT-PCR 结果示：5E,14E 组较 5C,14C 组 PPARγmRNA 表达分别增加 1.31 倍(P < 0.01）和 1.39 倍(P < 0.01）；Runx2mRNA 表达分别下降 1.79 倍(P < 0.01）和 1.45 倍(P < 0.01）；ALPmRNA 表达亦分别下降 1.90(P < 0.01）倍和 1.54 倍(P < 0.01）。吡咯列酮干预 5E 组较 14E 组 PPARγmRNA 表达增加 1.18 倍(P < 0.01），Runx2mRNA 表达下降 1.45 倍(P < 0.01），ALPmRNA 表达亦下降 1.10 倍(P < 0.01）。

结论 吡格列酮干预明显促进成骨诱导分化的大鼠骨髓间充质干细胞向脂肪细胞分化，成骨诱导分化时间越短，转脂分化能力越强。噻唑烷二酮药物 TZDs 的促转脂作用可能是骨骼代谢负性影响的机制之一。

P21 螯合甘氨酸钙抗去势大鼠骨丢失作用

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目的 自美国发明专利(专利号 4863898）证实氨基酸螯合物是以螯合整体被人体吸收并经血液运输至靶向组织而被利用以来，对氨基酸螯合物的研究日益引起人们的广泛关注。南开大学生产的螯合甘氨酸钙已取得国家抗骨质疏松保健品专利(专利号 CN1436770）,在临床应用多年具有抗骨质疏松作用，为此我们以骨密度、骨代谢、显微 CT 三维重组和骨组织形态计量等指标，观察去势大鼠骨质疏松模型服用螯合甘氨酸钙，探讨其抗骨质疏松作用与机制。

方法 用 60 只 SD 雌性大鼠，分 6 组每。在服药 100 天处死，行尿 I 型胶原 C 端肽（CTX-1）测定及全股骨骨密度测量和股骨下端不脱钙切片骨计量学与显微 CT 重建，采用美国 GE 公司 eXplore Locus SP 型μCT，依扫描协议 largetube_14um_150min_ss 进行。测试与分析软件：Micview V2.1.2 ，分割值：1200，选股骨下端骨骺板下 2mm^3兴趣窗重建、并进行三维重建结构计量学测量。

结果 ①骨密度结果：大鼠手术去势 100 天后，出现明显的骨质疏松。BMD 在假手术与去势对照组间差异显著。各实验组与去势对照组之间比较，骨矿物含量间也均有显著性差异，以低剂量组增加值最大（假手术 132.8±5.59 去势 117.4±4.39,低剂量 130.4±3.85,$p<0.001$）。②骨代谢指标：尿中 CTX-1 测定在假手术与去势组；去势与各实验组间均有统计学意义。③骨计量学显示，去势后骨体积密度显著性下降，由假手术组的 53.00±3.20％降至 19.16±2.97％（$p<0.001$）；经用螯合甘氨酸钙后得到改善（升至 44.02±2.34％与去势组比较 $p<0.001$）。同时发现在假手术与去势和去势与螯合甘氨酸钙、二膦酸盐组之间，骨计量学的骨的四环素标记率，类骨质的表面密度、平均类骨质表面厚度及动态指标观察中的骨矿化沉积率与骨矿化延迟时间等指标均有显著性差异。在三维重建显微 CT 观察中，同样发现骨小梁体积比(BV/TV)与骨表面积体积比(BS/BV)显示结果与骨计量学骨体积统计分析结果相似，只是数值均同比例有所减少。

结论 服用螯合甘氨酸钙各与去势对照组比较除高剂量外，其余各组的骨密度与去势对照组间存在显著性差异，证实大鼠股骨下端骺板下的骨量得到显著改善，这与显微 CT 与大体组织图像观察和骨组织形态计量学观察结果一致。总之在口服 40mg•Kg^{-1}•d^{-1}(螯合甘氨酸钙净含量约 10mg•Kg^{-1}•d^{-1})时，具有刺激成骨细胞作用，能有效防治大鼠实验模型出现骨质疏松作用。

P22 The Effect of misoprostol on osteoprotegerin in the bone of ovariectomized rats

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Objective To investigated the influence of misoprostol on bone mineral density(BMD) and OPG in ovariectomized (OVX) rats.

Methods Thirty female Wistar rats aged 3 months were divided into three groups: Sham(A), OVX(B),OVX+ misoprostol（C） with 10 rats in each group. The C groups treated orally 2 ㎎/㎏/d misoprostol for 28 days. All rats were sacrificed having treatment, and BMD was measured by dual-enery X-ray absorption, and reverse transcription-polymerase chain reaction(RT-PCR) examination indicated the expression of OPG on mRNA level in tibial metaphyses.

Result The BMD of rats shows that A group is the highest one, while the C group is higher than B group. There is significantly difference between the A group, B group and C group. The OPG of three groups of rats show significantly difference too, C group higher than B group, B group higher than A group.

Conclusion Misoprostol can effectively prevent osteoporosis in ovariectomized rats by up-regulation OPG mRNA level and inhibiting osteoclastic bone resorption.

Key words misoprostol;BMD; Osteoprotegerin (OPG); RT-PCR

P23 不同时期应用甲状旁腺激素片段对糖皮质激素相关骨质疏松的影响

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目的 了解早期应用重组人甲状旁腺激素片段 1-34 与延迟应用对糖皮质激素诱导的骨质疏松是否存在着不同。

方法 选用 36 只日本大耳白兔，分为 3 个组，其中 A 组做为空白对照组，不施加任何处理因素，B 组为早期干预组，C 组为延迟干预组。B 组和 C 组首先在四周内注射马血清 10mg/kg 两次以加强激素造模的作用，第 5 周每天注射一次地塞米松，第 6 至第 9 周每周注射 2 次地塞米松，剂量为 10mg/kg，B 组从第 5 周开始使用地塞米松时同时给予重组人甲状旁腺激素片段 1-34，20ug/天至第 12 周；C 组第 9 周开始应用直到第 16 周，B 组第 12 周、C 组第 16 周处死动物，取第三腰椎进行骨形态学及 DXA 骨密度检查，比较 3 组间这几项指标是否不同。

结果 骨形态学检查 A 组骨小梁结构最好，骨小梁占整个图像百分比为 16.50%，B 组次之，为 8.21%，C 组最差，为 4.5%，三组间的差异存在着统计学意义，而骨密度检查在 3 组间没有差别。
结论 与不使用糖皮质激素相比，早期使用和延迟应用甲状旁腺激素都可以延缓骨矿含量的流失，早期使用效果更好，但是不能完全阻止这种流失，表明需要更严格地掌握糖皮质激素使用适应征，我们也需要更有力的方法减少糖皮质激素应用造成的骨量流失。

P24 降钙素与 17β-雌二醇对体外培养成骨细胞增殖与分化的影响

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目的 比较降钙素（Calcitonin,CT）及雌激素对体外培养成骨细胞增殖和分化的影响。
方法酶消化法分离培养新生 SD 大鼠成骨细胞（osteoblast,OB）,取第二继代在培养液中分别加入不同浓度的 CT 和 17β-雌二醇(17β-estradiol,E_2)，观察 OB 的增殖能力（MTT 法用波长 570nm 处 OD 值表示）及分化功能（用碱性磷酸酶活性 ALP 表示）。
结果增殖率测定 CT 组从 10^{-12}mol/l 起 OD 值均较对照组增加，且呈剂量依赖关系，但浓度≥10^{-9}mol/l 差异才有显著性(P<0.05)；E_2组在 10^{-9}-10^{-7}mol/l 范围内的 OD 值均较对照组增加(P<0.001)，以 10^{-8}mol/l 作用最为明显。ALP 活性 CT 组从 10^{-12}mol/l 起均较对照组增加，也呈剂量依赖关系，但≥10^{-10}mol/l 差异有显著性(P<0.05)；E_2组在 10^{-9}-10^{-7}mol/l 范围内均较对照组增加(P<0.05)，以 10^{-8}mol/l 作用最强。
结论 适当浓度的 CT 及雌二醇均可促进体外培养 OB 增殖和分化。

P25 The Signal Pathway Involved in the Process of Cbfa1 Protein Expression and Activity in Osteoblasts by Icariin

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Objective To investigate the effects of icarrin on the activity and protein expression of cbfa1 in rat osteoblasts cultured in vitro and whether MAPK pathway is involved in this process.
Methods Calvarial osteoblasts were obtained from newborn (<24h) SD rats by trypsin-collagenase digestion method. Then the second generation osteoblasts were cultured in the medium containing icariin (10ng/ml) or estradiol (10^{-8}mol/L) with or without ERK specific inhibitor (u0126) or p38 specific

inhibitor (SB203580). Nuclear protein was extracted from osteoblasts. And then the activity of cbfa1 was detected by ELISA. The amounts of cbfa1 protein were detected by Western blot.

Results Calvarial osteoblasts were obtained successfully and were used in this study after indentified by ALP and mineralized nodus staining. Icariin and estradiol could also promote the expression of protein and activity of cbfa1. U0126 (inhibitor of ERK signal pathway) or SB203580 (inhibitor of ERK signal pathway) could partly inhibit the increase of the expression of protein and activity of cbfa1 by icariin and estradiol.

Conclusion Icarrin and estradiolhad the effects on stimulating the proliferation and maturation of cultured osteoblast *in vitro* by increasing the activity and expression of cbfa1. The inhibitor of MAPK could partly decrease cbfa1 activity by inhibiting the MAPK pathway, so MAPK pathway may be involved in the process of proliferation and mineralization of osteoblast by icariin.

P26 正常和 2 型糖尿病去卵巢模型大鼠体外成骨骨细胞

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目的 建立成年正常和 2 型糖尿病去卵巢模型大鼠骨髓体外成骨细胞样细胞的培养方法。

方法 1、健康雌性 Wistar 大鼠，2.5 月-3 月龄，体重 180-220g，高糖高脂饲料（蔗糖 20%、熟猪油 15%、胆固醇 2.5%）喂养 4 周，1%链脲佐菌素溶液 30mg/kg 腹腔注射，注射后 4 周测定大鼠空腹尾静脉血糖，血糖≥7.8mmol/L 被认为诱导 2 型糖尿病模型成功。2、2 型糖尿病模型成功后 1 周为去卵巢组大鼠行去卵巢手术，10%水合氯醛 3ml/kg 腹腔注射麻醉后沿大鼠背部正中切开皮肤并在脊柱两侧分别切开肌层取出卵巢后逐层缝合。3、2 型糖尿病模型大鼠去卵巢后 4 周随机选择 2 型糖尿病去卵巢模型大鼠和成年正常大鼠各 1 只，麻醉后处死，无菌条件下取出股骨。4、用α-MEM 冲洗骨髓腔获得骨髓细胞，并稀释细胞成 4×10^{6}个/ml 浓度，将细胞悬液置于 25cm^{2}培养瓶内，培养基为 10%胎牛血清α-MEM，其中含 10mmol/Lβ-甘油磷酸钠，50mg/L 维生素 C，10^{-5}mmol/L 地塞米松磷酸钠，培养瓶置于 5%CO_2、37℃培养箱内培养，用倒置相差显微镜观察成骨细胞样细胞形态变化。5、培养 10 天左右传代，取第三代细胞进行固定和碱性磷酸酶染色，碱性磷酸酶染色阳性细胞被认为是成骨细胞样细胞。6、取第三代细胞进行 MTT 实验绘制成骨细胞样细胞生长曲线，判断成骨细胞增殖能力。

结果 1、倒置相差显微镜下观察细胞，细胞由圆形变成椭圆形、长梭形。在培养第 3 天细胞逐渐变形。2、成骨细胞样细胞酶学检查，可见大量碱性磷酸酶染色阳性成骨细胞样细胞。3、预测 MTT 实验中 2 型糖尿病去卵巢模型大鼠成骨细胞样细胞增殖能力较正常成年大鼠成骨细胞样细胞增殖能力强。

结论 正常成年大鼠和 2 型糖尿病去卵巢模型大鼠骨髓体外培养成骨细胞样细胞的方法建立，分离培养的细胞有碱性磷酸酶阳性的特征。

P27 低氧对小鼠骨髓细胞向破骨细胞分化的影响

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目的 通过观察体外低氧环境对小鼠骨髓细胞向破骨细胞分化的影响，从而探讨低氧对破骨细胞生成的影响。

方法 取出生 2 天内新生小鼠颅盖骨培养成骨细胞，纯化后传代。6～9 周龄雄性小鼠，断颈法处死，75%乙醇浸泡 5 分钟，取四肢于冷 PBS 液中，分离出股骨和肱骨，剪去骨干两端，冲洗骨髓，收集细胞混合液接种到培养皿中培养 30 分钟，收集未贴壁细胞，1000r/min，4° C 离心 7 分钟，弃上清，沉淀用含 10%胎牛血清，1,25（OH）$_2$D$_3$（10^{-8}mol/L）、地塞米松（10^{-8}mol/L）α-MEM 培养液重悬。培养第二天，去除未贴壁细胞，加入无血清α-MEM 培养基。培养第三天，加入第 3～5 代成骨细胞和骨髓细胞共培养，然后将细胞分别放入 20%、3%氧浓度（氧浓度用氮气平衡后自动调节），5%CO2，95 空气，37° C 湿热孵箱中培养。48 小时后，用含 0.25%胰蛋白酶/EDTA 的 1mlPBS 液作用 10min 将成骨样细胞消化下来，弃之。再加入纤维消化酶破骨细胞，制成细胞悬液，经 PI 染色后用流式细胞仪检测细胞周期。72 小时后提取细胞总 RNA，用 RT-PCR 技术分别检测 20%和 3%氧浓度下 OPGmRNA、及 RANKLmRNA 的表达；用 Western blotting 技术检测 RANK 蛋白的表达。

结果 1、在 G1 期，常氧组和 3%氧浓度组细胞数含量比分别为（81.13±1.31）%和（73.60±0.76）%，3%氧浓度组的细胞数含量比明显低于常氧组（P＜0.01）;在 G2 期，常氧组和 3%氧浓度组细胞数含量比分别为（8.57±0.48）%和（14.20±0.44）%（P＜0.01），3%氧浓度组的细胞数含量比明显高于常氧组；在 S 期，常氧组和 3%氧浓度组细胞数含量比分别为（10.63±1.17）%和（12.20±0.33）%，无统计学差异。2、常氧组相比，3%氧浓度时，OPGmRNA 表达从 0.372±0.0003 下降到 0.325±0.003（P＜0.01）；RANKmRNA 表达从 0.105±0.003 增加到 0.188±0.003（P＜0.01）；RANKLmRNA 表达从 0.276±0.003 增加到 0.532±0.001（P＜0.01）。RANK 蛋白表达从 18.033±0.252 增加到 20.433±0.153（P＜0.05）。

结论 低氧可促进小鼠骨髓细胞向破骨细胞样细胞分化，低氧时破骨细胞分化活跃，细胞增殖能力增强，细胞数量快速增加。

P28 2 型糖尿病骨质疏松大鼠骨密度与生物力学关系初步研究

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目的 探讨 2 型糖尿病骨质疏松大鼠骨密度与生物力学关系。

方法 （1）.分组：健康雌性 Wistar 大鼠 100 只，2.5-3 月龄，体重 180g-220g，随机分为正常对照组（NC 组，24 只）、正常双侧卵巢切除组（NOVX 组，26 只）；2 型糖尿病对照组（DC 组，24 只）、2 型糖尿病双侧卵巢切除组（DOVX 组，26 只），组间大鼠体重无统计学差异。（2）.2 型糖尿病模型建立:高糖高脂饲料 8 周后小剂量链脲佐菌素注射，2 周后空腹血糖（FBG）>7.8mmol/L 且伴有胰岛素敏感性降低者为模型建立。（3）.2 型糖尿病骨质疏松大鼠模型建立:糖尿病模型建立后大鼠进行双侧卵巢切除术，1 月后，模型建立。（4）.骨密度测定：各组大鼠分别于去卵巢后的 0 周、2 周、4 周、6 周、8 周、10 周、12 周，应用采用小动物骨密度测定软件进行骨密度测定。（5）.生物力学测定：0 周、4 周、8 周、12 周每组各取 5 只大鼠处死，双侧股骨三点弯曲实验。

结果 实验期间，2 型糖尿病大鼠组血糖均明显高于正常组($p<0.01$),糖尿病大鼠各组间无差异($p>0.05$)。与正常组大鼠相比，2 型糖尿病各组大鼠体重在各个时期均明显增高($p<0.01$)。股骨三点弯曲试验中对最大载荷、最大应力、能量吸收的测定显示，随着去卵巢时间的延长，生物力学的各项指标均显著降低（$p<0.01$），与正常对照组比较，0 周、4 周、8 周、12 周去卵巢大鼠组均显著降低（$p<0.01$）；2 型糖尿病组随时间延长，骨密度逐渐降低，股骨生物力学各项指标也明显降低（$p<0.01$），与骨密度的改变一致。

结论 2 型糖尿病骨质疏松大鼠的股骨生物力学的改变与骨密度的改变具有明显的正相关。

P29 体质量对去卵巢大鼠骨密度影响的初步探讨

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目的 观察大鼠去卵巢后体质量变化对股骨骨密度的影响。

方法 采用 6 月龄雌性 Wistar 大鼠 40 只，随机分为 2 组，一组切除双侧卵巢，另一组行假手术。术后监测体质量变化，喂养 8 周后处死，取股骨检测骨密度(BMD)。

结果 去卵巢后动物体质量增加明显。去卵巢组阴道细胞学无明显的动情周期，表现为低雌激素状态；子宫横切面积较假手术组显著缩小，且子宫内膜厚度、内膜上皮高度、内膜腺体面积百分比等形态计量指标均小于假手术组（$P<0.05$）。去卵巢组的 BMD、骨矿含量(BMC)均低于假手术组，但差异无统计学意义；大鼠单位体质量的 BMC 在去卵巢组明显降低（$P=0.003$）。经多元逐步回归分析，BMC 与第 8 周体质量正相关、体质量差负相关；标化 BMC 与体质量差负相关。

结论 成功建立去卵巢后骨质疏松动物模型。去卵巢后大鼠一定体质量的增加可能部分减缓去卵巢所致的骨量下降,但过度的体质量增加可能导致单位体质量 BMC 的下降,引起骨质疏松。

P30 何种骨水泥强化技术可用于腰骶融合术中骶骨椎弓根钉松动后的补救？

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目的 在骨质疏松骶骨标本上，对两种椎弓根钉和三种骨水泥（PMMA）强化骶骨钉的最大拔出力进行生物力学比较。

方法 11 具新鲜骨质疏松骶骨标本用于实验。经骨密度测试后，在同一骶骨标本上，依次建立 5 种骶骨钉固定模型，并利用 MTS 材料测试机进行轴向拔出测试如下，A 组：单皮质椎弓根钉（左侧）；B 组：双皮质椎弓根钉（右侧）；C 组： PMMA 钉道强化单皮质椎弓根钉（建立于 A 组拔出后）；D 组：PMMA 钉道强化侧翼钉（右侧）；E 组：后凸成形技术支持下的 PMMA 强化侧翼钉（左侧）（图 1）。记录各种骶骨钉技术的最大拔出力并比较。

结果 11 具标本的平均骨密度为 0.71±0.08g/cm^2。C 和 D 组的 PMMA 注射量无显著差异（P>0.05），但是，两者的 PMMA 注射量均显著低于 E 组（P<0.05）（表 1，图 2）。A 与 D 组的螺钉拔出力无显著差异（*P*>0.05），然而，此两种固定的拔出力均显著低于 B、C 和 E 组（*P*<0.05）。B 组的螺钉拔出力与 E 组无显著差异（*P*>0.05），但是，两者的拔出力均显著低于 C 组（*P*<0.05）（表 1）。

结论 在骨质疏松患者的骶骨固定中，双皮质骶骨椎弓根钉较单皮质具有更高的固定强度。骶骨椎弓根钉一旦发生松动，PMMA 钉道强化和后凸成形技术支持下的 PMMA 强化侧翼钉均可成为理想的补救手段。

P31 骨质疏松程度对骶骨椎弓根钉固定强度的生物力学影响

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目的 评价骨质疏松程度对骶 1 双皮质椎弓根钉和骨水泥（Polymethylmethacrylate: 以下 PMMA）强化单皮质椎弓根钉疲劳载荷后的下沉位移和轴向拔出力的影响。

方法 25 具骨质疏松成人新鲜尸体骶骨标本用于实验。按尸体腰椎 DEXA 测定的骨密度（Bone Mineral Density:以下 BMD）值将标本分 A 组（N = 9，BMD = 0.7-0.79 g/cm^2）、B 组（N = 8，BMD = 0.6-0.69 g/cm^2）和 C 组（N=8，BMD<0.6g/cm^2）。在同一标本的 S1 左侧置入双皮质椎弓根钉，右侧置入 PMMA 强化单皮质椎弓根钉（图 1）。使用 MTS 实验机对螺钉尾部进行 30~250N 的头尾方向循环加载 2000 次后（图 2），测定椎弓根钉的下沉位移和轴向拔出力。

结果 A 组和 B 组中的所有螺钉均未出现锚定失败（定义为 2000 次载荷中，螺钉下沉超过 2 mm），C 组中，双皮质椎弓根钉锚定失败为 6 例（75%），PMMA 强化的锚定失败为 5 例（63%）。A 组中，双皮质钉和 PMMA 强化钉在下沉位移和轴向最大拔出力方面无显著差异；而在 B 组，PMMA 强化技

术的下沉位移显著低于双皮质固定，其轴向最大拔出力显著高于双皮质固定。A 组的双皮质钉和 PMMA 强化钉的下沉位移均显著低于 B 组，A 组的双皮质钉的最大拔出力显著高于 B 组，但是，在 PMMA 强化固定的最大拔出力方面，A 组与 B 组间无显著差异。C 组内固定失败例中，PMMA 强化固定的承载次数显著高于双皮质固定（表 1）。

结论 当 BMD 大于 0.70 g/cm2 时，双皮质和 PMMA 强化的骶骨椎弓根钉可获得同等的锚定强度；当 BMD 值为 0.6-0.69 g/cm2 时，PMMA 强化单皮质骶骨椎弓根钉的锚定强度显著高于双皮质固定；当 BMD 值低于 0.6 g/cm2 时，两种锚定方式均容易导致早期松动。因此，术前腰椎 BMD 的评价是正确选择骶骨螺钉固定方式的关键

P32 Comparison of the effects of alendronate sodium and calcitonin on bone-prosthesis osteointegration in osteoporotic rats

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Aim comparative study of the effects of alendronate sodium and calcitonin on bone-prosthesis osteointegration in osteoporotic rats, so as to provide valuable reference for nowadays clinical options of medication.

Methods 40 female SD rats aged 5 months were randomly set into A,B,C.D groups. Except for A group, the other were ovariectomized and osteoporosis model established (lumbar BMD was decreased by 20% four weeks after ovariectomy). All the rats received implantation surgery at their tibial plateau.Then the rats in Group C and D were given ALO (7mg /kg/w) orally and CT (5IU/kg/d) subcutaneously for 12 weeks, respectively. Prior to the execution, application of tetracycline hydrochloride for staining in vivo was done.After harvesting and embedding, the tibia with implants were cut into thin slides, then the bone histomorphometry was measured to observe the new bone around prosthesis, and to caculate the osseointegration rate of the implants. By comparison, the effect of the two drugs on osseointegration were evaluated.

Results (1)Both ALO and CT can effectively enhance the volume of bone mass surrounding the HA prosthesis and also significantly lever up osseointegration rate to 63.7% and 45.7% , respectively ($p<0.05$). However, ALO produced more periprosthesis osseointegration rate than CT, incresed by18% ($p <0.05$).(2) The rats' lumber BMD in ALO and CT groups both increased, from0.081 ±0.009 g/cm2and0.078±0.009 g/cm2 to 0.116 ± 0.008 g/cm2 and 0.109±0.010 g/cm2, respectively. Moreover, the effect of ALO shows more pronounced than that of Calcitonin.

Conclusions In osteoporotic conditions, both adiminstration of ALO orally and CT subcutaneously can enhance periprosthesis bone mass and the effects on osteointegration between host bone and prosthesis. Compared with CT , the effect of ALO is more pronounced.

P33 老年男性动脉硬化及骨质疏松症与 AHSG 基因多态性的关系

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目的 探讨老年男性α2-HS 糖蛋白(AHSG)基因多态性与动脉硬化、骨质疏松、血脂以及血清骨相关生化指标的关系。
方法 用 ELISA 法测定 208 名住院老年男性患者的骨特异性碱性磷酸酶(BAP)、Ⅰ型胶原羧基末端肽、Ⅰ型胶原氨基末端肽和护骨素及瘦素的浓度；对患者基因组的 DNA 样品作限制性内切酶 SacI 的 PCR-RFLP 检测以确定其基因型，全自动生化仪酶法测定血清 TC、TG、HDL-C、LDL-C，电极法测定血钙，DXA 测定腰椎正位、仰卧侧位腰椎和股骨颈的骨密度(BMD)。GG 基因型患者做骨组织病理活检，彩色超声诊断仪测定颈动脉内中膜厚度(IMT)。
结果 (1)老年男性患者 AHSG 基因 CC 型,CG 型和 GG 型分布频率分别为 60.2% ,26.2%和 13.6%。不同基因型血脂、血 Ca2＋和骨生化指标有明显差异；(2)协方差分析显示老年男性不同 AHSG 基因型在正侧位腰椎、股骨颈的 BMD 和 IMT 差异有显著统计学意义；(3)GG 型老年男性患者骨组织病理切片和彩超验证了 AHSG 多态性基因变异与动脉硬化、骨质疏松发生发展的相关性。
结论 AGSH 基因多态性变异与老年男性血脂、血 Ca2＋、血清骨生化指标差异，以及动脉硬化和骨质疏松的发病密切相关。

P34 CALCIUM ADMINISTRATION ALLEVIATED THE ELEVATED BONE TURNOVER INDUCED BY ACUTE CITRATE LOAD

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Aims To investigate the effect of calcium supplements on the elevated bone turnover induced by acute citrate load.
Methods A study was conducted in 22 volunteers . Volunteers received four standardized interventions with a interval 2 to 3 weeks in random order, containing: treat A, placebo (saline

solution) infusion only; treat B, citrate infusion only; treat C, citrate infusion plus 1.2 gram oral calcium administration ten minutes before citrate infusion; treat D, citrate infusion plus simultaneous intravenous (i.v.) infusion of calcium at the rate of 100mg/h. Serial blood samples were collected for the determination of ionized calcium, intact parathyroid hormone and bone markers C-telopeptide of type 1 collagen (CTX) and osteocalcin (OC) at the start of infusion, in the middle and at the end of the infusion, and 120 minutes after completion of infusion and 24 hours later.

Results Treat B resulted in a continuous increase in serum levels of the bone formation marker OC [(39.8±16.8)% for peak] and bone resorption marker CTX[(61.9±34.4)% for peak], followed by a slow recovery after the end of intervention. Both calcium administrations depressed the increment of CTX at the endpoint of citrate infusion (i.v calcium) or afterward (oral calcium), and rapidly normalized the serum level of CTX to the basal 2 hours after end of citrate infusion, which was still retained higher level in treat B [(36.0±30.4)%]. Changes of CTX were correlated to the changes of ionized calcium in treat C and D (P<0.005). Further analysis showed that i.v. supplement of calcium significantly enhanced the ratio of OC/CTX during the period from starting infusion to 2 hours after end of infusion when compared to treat B, while similar effect for treat C was only detected after end of citrate infusion.

Conclusions Calcium supplement has effect to attenuate the short-term elevated activity of bone resorption induced by citrate infusion.

P35 Rosiglitazone Induces Osteoblasts Apoptosis via the Activation of PPARγ-GSK3β Pathway

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Introduction and Objective Thiazolidinediones (TZDs), as insulin sensitizers, are widely used in clinics for type 2 diabetic patients. But recently, clinical trials showed that TZDs could inhibit bone formation and increase the risk of osteoporotic fracture[1-3]. As TZDs are ligands for PPARγ, activation of PPARγ could improve insulin resistance, its activation could also induce cell apoptosis of many cell types including osteoblasts[4]. So our hypothesis is that TZDs might inhibit bone

formation by inducing osteoblasts apoptosis. This study aimed to explore the effects of Rosiglitazone on osteoblasts apoptosis and its underlying pathway.

Materials and Methods In this study, osteoblasts were isolated from cranium of newborn mice. Osteoblasts were divided into control group (CON) and Rosiglitazone treatment group (RGZ). After Rosiglitazone treatment, osteoblast apoptosis was quantified by flow cytometry, PPARγand glycogen synthase kinase 3beta (GSK3β) activity were evaluated by Western blot. siRNA for PPARγ and GSK3 β were added to study the change of osteoblast apoptosis following Rosiglitazone treatment.

Results Rosiglitazoneinducedosteoblasts apoptosis with significant activation of PPARγand GSK3β. While siRNA for PPARγcould block rosiglitazone-induced osteoblast apoptosis with suppressing the activity of GSK3β in osteoblasts; and siRNA for GSK3β could block rosiglitazone-induced osteoblast apoptosis without affecting the activity of PPARγ.

Conclusion & Discussion This study showed that rosiglitazone induced osteoblasts apoptosis via activation of PPARγ-GSK3β pathway. GSK3β might be a potential target located in the downstream of PPAR for intervention of TZDs-induced bone loss. *In vivo* study is needed to confirm this in the future studies. This project was supported by Shanghai Pujiang Program (09PJ1410300).

P36 柠檬酸盐抗凝剂对机体电解质代谢影响的差异性分析

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目的 探讨柠檬酸盐抗凝剂对机体电解质代谢影响的性别及种族差异性，为可能的临床干预提供参考。

方法应用自身交叉、安慰剂对照研究模式，对 22 名年龄匹配的国人（男女各 11 人）和 10 名白人男性志愿者以标准化的干预方案分别给予柠檬酸盐抗凝剂（ACD-A）和生理盐水（安慰剂）的输注（洗脱间隔期为两至三周）；同时采集干预过程中的系列血样和尿样进行血、尿电解质检测。

结果 1）相同剂量柠檬酸盐的输入可导致国人女性较国人男性有更高幅度的离子钙浓度降幅[(28.65±4.46)% Vs (23.03±3.78)%, P<0.005], 且与男女间的基础离子钙浓度和白蛋白水平的差异无关；柠檬酸盐干预可同时导致国人尿钙排泄增加(干预前 0.39±0.32 Vs 干预后 0.92±0.45, P<0.0001), 尿钙的排泄增幅与血离子钙水平降幅间呈显著相关（P=0.037, r=0.457）。国人男女间在柠檬酸盐致血镁、磷及白蛋白的代谢影响上无显著差异。2）国人男性与白人男性在柠檬酸盐致血钙、镁、磷、白蛋白和尿钙排泄的代谢变化上无差异。与白人男性相比，国人男性

离子钙的基础水平较高[（1.27±0.04）mmol/L
Vs（1.22±0.02）mmol/L，P=0.0015]，白蛋白的生理节律性波动幅度亦大于白人（P<0.0001）。
结论柠檬酸盐抗凝剂对机体钙离子的代谢影响存在着性别差异性，表现为女性的降幅高于男性。是否该对女性机采献血者采取特殊关怀措施值得关注。

P37 个体骨代谢生化指标的生物学节律

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目的 了解骨代谢特异性指标及骨代谢相关电解质的昼间生物学波动特点。
方法 比较了 10 名健康男性志愿者（平均年龄 29.9±4.2 岁）在上午 8 到 12 点间六个时间点的血液骨代谢生化指标：骨保护素（OPG）、骨钙素(OC)、骨特异性碱性磷酸酶(BALP)、Ⅰ型胶原蛋白 C 端片段(CTX)、骨特异性抗酒石酸酸性磷酸酶（BTRAP）、全段 PTH(i-PTH)及相关电解质的变化和各指标间的相互关系。
结果 骨生成指标 OPG,BALP 及 PTH 呈小幅度的下降趋势；骨生成指标 OC，骨吸收指标 CTX 和血磷水平则降幅明显(分别为-11.7%，-17.7%，和-22%)，最低点大约都出现在 10 到 11 点之间，。BTRAP 呈无规律性的小幅波动。血镁和血钾水平则呈明显关联的上升趋势（分别为 4.9%，8%）。相关分析表明，PTH 与这些指标的生物学节律波动无显著相关，血离子钙及血磷水平与骨代谢指标节律波动的相关性要大于血总钙水平，CTX 的波动与多数指标相关。
结论 个体骨代谢特异性指标在上午呈规律性的下降趋势，骨吸收指标 CTX 的变异幅度明显大于骨形成指标。PTH 水平与此生物学节律波动无明确关联。

P38 Metabolic Effect of Citrate Administration on Bone

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BACKGROUND Citrate is one of most common anticoagulants during apheresis donations. Citrate anticoagulation might cause metabolic effects on bone turnover in apheresis donors. This study

investigates the effects of citrate application on bone turnover through monitoring the serum level of bone biochemical markers.

STUDY DESIGN AND METHODS A placebo controlled, cross-over trial was conducted on 10 male volunteers. Two standardized infusions with citrate or saline solution in random order were administrated separately after 2 weeks wash-out period. Citrate infusions were performed at a fixed dose for 80 minutes within the unique timeframe. Serial blood and urine samples were collected and analysed for bone biochemical markers and electrolytes during observation period.

RESULTS Infusion of citrate resulted in an increase of serum levels of bone formation marker osteocalcin (OC) and bone resorption marker C-telopeptide of type 1 collagen (CTX). Higher increment of CTX compared to OC and increase of CTX/OC ratio were observed due to citrate intervention. Citrate infusion also led to a profound decrease in serum levels of ionized calcium (iCa), phosphate and increase in serum levels of intact parathyroid hormone (iPTH) and the urinary excretion of iCa. The alternation of iCa correlated inversely with that of iPTH and urinary iCa. Changes of both bone markers OC and CTX were positively correlated with the changes of iPTH.

CONCLUSION Infusion of citrate results in profound alterations of serum markers of bone turnover. The induced higher elevation of CTX implicates the shift of bone turnover towards an increased bone resorption.

P39 运动与雌激素对去卵巢大鼠股骨骨密度及生物力学性能的影响

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目的 对比运动和雌激素对去卵巢大鼠股骨骨密度和生物力学性能的影响。

方法 将 40 只 5 月龄雌性 SD 大鼠随机分为基础对照组(Basal)、假手术组(Sham)、去卵巢组(OVX)、去卵巢加雌激素干预组（OVX+E）、去卵巢加运动干预组（OVX+Run）。OVX+E 组在手术 1 周后开始每天予肌肉注射己烯雌酚（0.025mg/kg，持续 12 周）。OVX+Run 组术后 1 周开始采用大鼠专用跑笼进行运动训练（跑速 6.4m/min，1 次/d，持续 12 周）。术后 13 周，对全部大鼠进行骨密度和生物力学指标的测定。

结果 (1)OVX+E 组与 OVX 组比较 BMD 值无明显差别；OVX+Run 组分别与 OVX 和 OVX+E 组比较 BMD 显著增加（$P<0.05$）；（2）OVX+Run 组、OVX+E 组极限剪切载荷、剪切强度极限、剪切弹性模量和最大剪应变显著高于 OVX 组（$P<0.05$），而与 Sham 组比较差别无统计学意义；

OVX+Run 与 OVX+E 组比较，剪切弹性模量明显升高（$P<0.05$）。

结论 运动和雌激素均能显著地提高去卵巢大鼠股骨骨密度和骨的生物力学性能，但运动能够更好地提高骨的硬度和抵抗变形的能力。

P40 雌激素对运动防治骨质疏松中骨组织计量学的影响

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目的 研究雌激素对运动防治骨质疏松中骨组织计量学的影响。
方法 64 只 S D 雌性大鼠随机分为 Basal 组、Sham 组、Ovx 组、Ovx+e1 组、Ovx+run 组、Ovx+e1+run 组、Ovx+e2 组、Ovx+e2+run 组。其中 Ovx+e1、Ovx+e1+run 组和 Ovx+e2、Ovx+e2+run 组于去卵巢术后一周开始肌肉注射不同剂量的己烯雌酚，前两组己烯雌酚剂量为 0.025mg/kg/次，1 次/d，后两组为 0.025mg/kg/次，1 次/4d，持续 12 周。Ovx+run 组、Ovx+e1+run 组、Ovx+e2+run 组于去卵巢术后 1 周开始采用大鼠专用跑笼进行运动训练 12 周。
结果 (1)Ovx+e1+run 组骨小梁面积百分比、骨小梁厚度、骨小梁数量的增加显著高于 Ovx+e1、Ovx+run 和 basal 组，骨小梁分离度也显著减少；
(2)Ovx+e2+run 组骨量较 Ovx+run 组为高，但与 Ovx+e2 组相比骨量并无增加。骨形成率（BFR/BS、BFR/BV、BFR/TV）和骨矿化率均有提高趋势，但破骨活性指标（Oc.No、Oc.No/Pm）与 Ovx+e2 组和 Ovx+run 组比较均无明显差别。
结论 不同雌激素水平对运动防治骨质疏松的效果产生显著影响,雌激素充足条件下，运动与雌激素可协同提高骨量及增加骨小梁面积和厚度，雌激素缺乏对运动提高骨量的效果起负面影响。

P41 铁调素及去铁胺对小鼠成骨细胞 MC3T3-E1 增殖及功能表达的初步研究

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目的 研究铁调素及去铁胺对小鼠成骨细胞 MC3T3-E1 增殖及骨钙（BGP），骨保护素（OPG）的 mRNA 表达。
方法 体外培养小鼠成骨细胞 MC3T3-E1,用 MTT 法检测铁调素（0、50 mmol/L、100 mmol/L、200mmol/L、300mmol/L）及去铁胺（0、50mmol/L、100mmol/L、200mmol/L、300mmol/L）作用小鼠成骨细胞 72h 后的增殖情况,并运用 RT-PCR 方法检测 OPG、BGPmRNA 表达。
结果 （1）不同浓度的铁调素作用小鼠成骨细胞 72h 后，可促进其增殖，OD 值显著增加（$p<0.05$），并在铁调素（100 mmol/L、200mmol/L、300mmol/L）干预后 OPG mRNA 和 BGP mRNA 表达增加，具有浓度相关性；（2）不同浓度的去铁胺作用小鼠成骨细胞 72h 后，可抑制其增殖，OD 值显著减少（$p<0.05$），并在去铁胺浓度（50mmol/L、100mmol/L）干预后 OPG mRNA 和 BGP mRNA 表达减少，无明显浓度相关性。
结论在不同铁环境中铁调素促进 MC3T3-E1 细胞增殖并上调 BGP、OPG mRNA 的表达，而去铁胺抑制 MC3T3

-E1 细胞增殖并使 BGP、OPG mRNA 的表达降低。

关键词 铁调素 成骨细胞 骨保护素 骨钙素 RT-PCR

Hepcidin and deferoxamine effect the proliferation and function expression in MC3T3-E1 osteoblasts cells of mice

Objective to study hepcidin and deferoxamine effect the proliferation and bone BGP、OPGmRNA expression in MC3T3-E1 osteoblasts cells of mice.

Methods The osteoblasts MC3T3-E1 were cultured in vitro,the effects of different levels of hepcidine（0、50 mmol/L、100 mmol/L、200mmol/L、300mmol/L）and deferoxamine（0、50mmol/L、100mmol/L、200mmol/L、300mmol/L）osteoblast proliferation were assessed by MTT colorimetry ;the expression OPG and BGP mRNA in MC3T3-E1was analyzed by semi-quantative RT-PCR.

Results (1)、Proliferation of MC3T3-E1 was promoted by hepcidine. Semi–quantative RT-PCR examination revealed:hecidine promote OPG and BGP mRNA expression .(2)、Proliferation of MC3T3-E1 was inhibited by deferoxamine. Semi–quantative RT-PCR examination revealed: deferoxamine inhibit OPG and BGP mRNA expression .

Conclusion in different iron surroundings hepcidine promotes proliferationin MC3T3-E1 osteoblasts of mice,and promotes OPG and BGP mRNA expression ,and deferoxamine inhibits proliferationin MC3T3-E1 osteoblasts of mice,and inhibit OPG and BGP mRNA expression.

Key words hepcidine; deferoxamine;OPG;BGP;RT-PCR;MTT

P42 WHO 骨折风险评估工具（FRAX）在成都地区女性人群中的应用

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目的 使用 WHO 骨折风险因子评估工具（FRAX）研究成都地区女性人群的 10 年骨折风险程度，以评估 FRAX 的应用价值和推广前景。

方法 纳入 2008 年 10 月～2009 年 3 月于四川大学华西医院骨密度室初次行 DXA 检查、年龄≥50 岁的成都地区汉族女性，排除 40 岁前绝经、已确诊糖尿病、高血压、肿瘤、既往可影响骨代谢疾病史、既往行抗骨质疏松治疗、罹患需长期接受影响骨代谢药物治疗的系统性疾病、检查前长期（3 月以上）居住在成都以外地区等的患者，按检查时是否骨折分为骨折组和非骨折组，按 FRAX 计算界面涉及的内容收集 10 年前的相关资料，并计算 10 年骨折风险程度。使用统计学软件 SPSS13.0 进行统计学分析，比较骨折组与非骨折组骨折风险程度的差异。

结果 共纳入研究对象 225 例，年龄为 62.2±8.0 岁，其中骨折组 62 例（含髋部骨折 9 例），年龄为 67.9

±7.0 岁，非骨折组 163 例，年龄为 60.0±7.2 岁，骨折组平均年龄高于非骨折组（p=0.000）。10 年前已绝经者共 132 例，其中骨折组 55 例，绝经年龄为 47.7±1.0 岁，非骨折组 77 例，绝经年龄为 49.0±3.0 岁，骨折组绝经年龄低于非骨折组（p=0.010）。10 年前父母髋部骨折史阳性者共 13 例,其中骨折组 12 例，非骨折组 1 例，差异有统计学意义（p=0.000）。FRAX 的在线评估结果为：骨折组 10 年主要骨质疏松性骨折风险程度为 2.9%±0.6%，髋部骨折患者 10 年髋部骨折风险程度为 0.5%±0.3%，非骨折组 10 年主要骨质疏松性骨折和髋部骨折的风险程度分别为 2.2%±0.5%和 0.3%±0.2%。统计学分析显示：骨折组 10 年主要骨质疏松性骨折风险程度比非骨折组明显增高（p=0.000），其中髋部骨折病例 10 年髋部骨折风险程度比非骨折组明显增高（p=0.000）。

结论 WHO 骨折风险评估工具（FRAX）对纳入人群中骨折风险程度不同的个体具有较好的甄别作用，可及早发现远期骨折风险程度严重的个体。FRAX 以网络为依托，使用成本低廉，适于基层及社区医院的推广。但本研究为回顾性研究，样本量偏小，缺少 10 年前骨密度资料，可能影响结果的准确性，值得进一步研究。

P43 定量超声骨质测量仪和双能 X 线骨密度测定仪测定结果的一致性比较

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目的 研究随年龄变化、绝经时间不同，QUS 所测左足跟强度指数（SI）的变化趋势是否与 DXA 所测 BMD 的变化规律相似；研究两种仪器测试结果的一致性随年龄变化的规律；结合骨质疏松的高危因素，研究 QUS 相较 DXA 诊断骨质疏松的敏感性及特异性；探讨 QUS 诊断骨质疏松的 T 值临界点。

方法 询问每位研究对象出生年月、病史、绝经时间、生活习惯（有无吸烟史），测量其身高、体重（计算体重指数）并记录。分别以年龄分组，每个病人均测量 L1-4 与左股骨近端（股骨颈、wards 三角、大转子）的 BMD 及左足跟 SI。所有数据均输入 EXCEL 并用 SPSS 软件包进行统计分析。

结果 共纳入 344 名受检者，各年龄段间体重及体重指数（BMI）差异无统计学意义。SI 随年龄、绝经时间增加的变化趋势相似于 BMD，均随年龄、绝经时间的增加逐渐降低；QUS 与 DXA 所测结果的一致性与年龄相关，同为 T≥-1.0,随年龄增加逐渐降低，同为-2.5，随年龄增加为先升高后降低，同为 T≤-2.5,随年龄增加逐渐增高；结合年龄、绝经年限，相较 DXA ，QUS 的诊断 OP 的敏感度随年龄、绝经时间增加，逐渐升高，但特异度却相对降低；QUS 诊断 OP 以 T 值-2.0 为临界点，诊断灵敏度及特异度相对较好。

结论 SI 随年龄变化规律相似于 BMD,QUS 与 DXA 诊断结果的一致性与年龄有关，QUS 诊断 OP 以 T 值-2.0 为阈值较好。

P44 脉冲电磁场治疗老年性骨质疏松症疗效观察

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目的 探讨脉冲电磁场（PEMFs）治疗老年性骨质疏松症的疗效。

方法 对我院诊断为老年性骨质疏松症且具有临床症状的 97 例患者随机分两组：A 组进行脉冲电磁场治疗第 1 个疗程每日一次，连续治疗 10 次后休息 3 天；第 2 个疗程隔日治疗一次，连续治疗 10 次后休息 7 天；第 3 个疗程隔 2 日治疗一次，连续治疗 10 次；B 组同上治疗后休息 30 天后重复上述第 1-3 个疗程的治疗，共治疗 60 次；治疗后随访 60 天。观察患者骨疼痛缓解情况和两组治疗前、后及随访时超声骨密度右侧跟骨超声振幅衰减（BUA）和超声声速（SOS）变化，其疗效进行对比分析。

结果 两组对骨疼痛均有缓解，且 B 组对疼痛缓解效果更明显，且随访时部分患者还存在延迟效果.B 组治疗后、随访时 BUA 及 SOS 较治疗前有统计学意义（$p<0.05$），A 组治疗前后超声骨密度无显著差异。

结论 脉冲电磁场对治疗老年性骨质疏松症缓解骨痛，提高骨密度效果明显，治疗时间长效果更显著。

P45 甲亢患者骨密度及骨代谢生化指标的临床观察

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目的 测定甲亢患者的骨密度及骨代谢生化指标，探讨甲亢骨质疏松发生的机理。

方法 选择在我院门诊和住院确诊的甲亢患者 149 例，均符合美国甲状腺学会及上海内分泌学会制定的诊断标准。病程 2 月至 10 年，除外肝、肾功能损害，未服影响钙、磷代谢的药物。149 例甲亢患者分为甲亢并有骨密度减低组和甲亢并有骨质疏松组。对照组 40 例为健康体检者，均无影响骨代谢的疾病，未服影响钙、磷代谢的药物。应用美国 LUNAR 公司双能 X 线骨密度仪（DEXA），检查 149 例甲亢患者和 40 例对照组健康人群腰椎（L_{2-4}）和近端股骨，包括（WARD’S 三角区，大转子，股骨颈）骨密度（BMD）变化，同时测定其中 81 例血清游离三碘甲状腺素（FT_3）、游离甲状腺素（FT_4）、高灵敏促甲状腺素（RTSH）、碱性磷酸酶（ALP）、骨钙素（BGP）、尿游离脱氧吡啶啉（D-pyd）的水平。

结果 1、甲亢时骨质疏松发生率：149 例甲亢患者均做骨密度测定，其中 45 例有骨密度减低，占 30.2%。其中 36 例有骨质疏松，占 24.1%。2、甲亢患者的 FT_3、FT_4、RTSH、ALP、BGP、D-pyd 水平均高于对照组，且有显著性差异。与对照组比较，甲亢患者各项骨代谢指标均明显升高。

结论 本研究骨代谢结果显示：甲亢组各项成骨指标—BGP、ALP 和破骨指标—D-pyd 均较对照组明显升高，其中破骨指标升高更加明显。说明甲亢时成骨细胞和破骨细胞的活性均增高，尤以破骨活性增

加较明显。前者为对照组的 2 倍，后者为对照组的 10~20 倍。这是由于过量的甲状腺激素刺激骨细胞，使其活性增强，骨转换率增高所致。当骨的吸收大于骨的形成，两者之差产生负平衡，结果导致相当程度的骨量丢失[1]，因此甲亢患者往往出现骨密度下降，甚至出现骨质疏松。相关结果表明：甲亢时 FT_3、FT_4水平愈高，破骨与成骨的代谢指标愈高，骨密度就愈低。本研究结果还显示：甲亢时 FT_3、FT_4明显增高，而 RTSH 明显降低，各项成骨与破骨指标皆与 RTSH 水平负相关。RTSH 是甲亢诊断及疗效观察的敏感指标，且在甲亢治疗过程中最晚恢复正常。故 RTSH 恢复至正常水平前骨高转换状态可继续存在，因此甲亢治疗时应注意保持 RTSH 水平在正常范围，以减少发生骨质疏松的危险性。所以，甲亢时甲状腺激素的增多可引起骨量的减少，发生骨质疏松，甚至可导致骨折。在治疗甲亢的同时应注意检测患者的骨密度，以便尽早发现骨质疏松，并采取相应的治疗措施。

P46 绝经后 2 型糖尿病妇女血脂水平和骨密度的关系

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目的 探讨绝经后 2 型糖尿病妇女血脂和骨密度的关系。

材料方法 将 290 例绝经后 2 型糖尿病妇女按 T 值分成骨质疏松组和非骨质疏松组；检测各组患者血清总胆固醇(total cholesterol，TC)、甘油三脂(triglyceride，TG)、高密度脂蛋白胆固醇(high density lipoprotein cholesterol，HDL-C)、低密度脂蛋白胆固醇(low density lipoprotein cholesterol ，LDL-C)以及腰椎正侧位(L1-L4)骨密度(bone mineral density，BMD)，进行组间比较，并分析血脂和骨密度的关系；对骨密度和多变量间的关系进行多元逐步回归分析；并用二元 logistic 逐步回归方法分析血脂和其他相关因素如年龄、绝经年限等与骨质疏松(osteoporosis，OP)间的关系。

结果 (1)绝经后 2 型糖尿病妇女的 HDL-C 与腰椎 BMD 存在负相关(r= -0.210，P=0.001)，LDL-C、TG、TC 与腰椎 BMD 无相关；年龄、绝经年限与腰椎 BMD 存在负相关(r1= -0.413，P1=0.000；r2= -0.456，P2=0.000)；体重指数(body mass index，BMI)与腰椎 BMD 存在正相关(r= 0.219，P=0.001) (2)在校正体重指数、绝经年限和年龄影响因素后，绝经后 2 型糖尿病妇女的 HDL-C 与腰椎 BMD 仍存在负相关(r= -0.119，p= 0.039)，而 LDL-C、TG、TC 与腰椎 BMD 仍无相关。(3)在多元逐步回归分析中，HDL-C (β1= －0.176，p=0.021)、绝经年限(β2=－0.328，p=0.011)、BMI (β3=0.292，p=0.001)分别与骨密度独立相关。(4)应用二元 logistic 回归方法进行分析,HDL-C (OR=0.128,p=0.007)、绝经年限(OR=0.919，p=0.042)、BMI (OR=1.242，p=0.000)仍与骨质疏松的发生有关。

结论 (1)绝经后 2 型糖尿病妇女的 HDL-C 与腰椎 BMD 存在负相关而 TC、TG、LDL-C 与腰椎 BMD 无相关。(2)绝经后 2 型糖尿病妇女的年龄、绝经年限与腰椎 BMD 存在负相关，而 BMI 与腰椎 BMD 存在正相关。

P47 喝茶与汉族绝经后妇女骨密度关系的临床研究

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背景 骨质疏松的发生与生活饮食习惯、生育、疾病因素密切联系。以前临床研究大多通过比较绝经后妇女喝茶组与无喝茶组的年龄、体质量指数、生活饮食习惯等基线情况，得出喝茶与高骨量、髋部低骨折发生率相关；但忽视基线中生育、疾病因素的比较。

目的 分析喝茶组与无喝茶组的生活饮食习惯、生育、疾病因素等基线情况可比性，观察喝茶与汉族绝经后妇女骨密度及骨折发生率的关系。

方法 随机调查福州常住汉族绝经后妇女 623 例，剔除 30 例，完成试验符合要求 593 例。分组：习惯喝茶（乌龙茶）组 112 例，无习惯喝茶组 481 例。专人调查受试者的年龄、职业、文化程度、生活习惯、生育情况、疾病因素和对骨质疏松的认识等，测量身高、体质量，计算体质量指数。用双能 X 线（DXA）骨密度仪检测腰椎和髋部骨密度。

结果 593 例绝经后妇女中，喝茶组占 18.89%，无喝茶组占 81.11%。比较两组年龄、职业、文化程度、生活习惯、生育情况、疾病因素和对骨质疏松的认识等，只有体质量两组比较有统计学意义，$p<0.05$，喝茶组体质量明显高于无喝茶组；其他组间比较无统计学意义。把体质量作为协变量，采用协方差分析比较两组骨密度，喝茶组大转子骨密度（0.807±0.117 kg/cm^2）高于无喝茶组（0.778±0.117 kg/cm^2，$F=4.167$，$p=0.042$，），差异有统计学意义，喝茶组 Ward's 三角骨密度（0.676±0.130 kg/cm^2）高于无喝茶组（0.643±0.138kg/cm^2，$F=5.269$，$p=0.022$），差异有统计学意义。绝经后骨折发生率比较：喝茶组 13.39%，无喝茶组 12.06%，$p>0.05$，差异无统计学意义。说明喝茶与汉族绝经后妇女高骨密度明显相关，但与绝经后骨折无相关。

结论 喝乌龙茶有助于汉族绝经后妇女维持髋部（大转子、Ward's 三角）高骨密度。

P48 温阳益气活血法治疗糖尿病骨质疏松症 30 例疗效观察

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目的 观察温阳益气活血法治疗糖尿病性骨质疏松症的临床疗效。

方法 将 60 例 2 型糖尿病性骨质疏松症患者, 随机分为**两**组,治疗组在常规西药治疗的基础上加用具有温阳益气活血的中药颗粒剂口服,对照组予常规西药治疗,连续用药 6 个月,测定治疗前后两组患者血钙、血磷、碱性磷酸酶**及尿** Ca/Cr,患者骨密度的变化。

结果 治疗组患者治疗后血钙、血磷、碱性磷酸酶**及尿** Ca/Cr,患者骨密度均较对照组明显改善, $P<0.05$

差异有统计学意义。治疗组疗效优于对照组。

结论 温阳益气活血法治疗糖尿病骨质疏松症的临床疗效确切。

P49 淫羊藿总黄酮治疗原发性骨质疏松症患者骨密度和骨代谢指标的变化☆

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背景 既往动物实验表明，淫羊藿总黄酮能有效抑制雌激素相关的骨丢失，但是相关的临床报道较少。

目的 观察淫羊藿总黄酮对原发性骨质疏松症患者骨密度的影响。设计、时间及地点：随机双盲，阳性对照临床试验，病例来自 2005-06/2007-09 华中科技大学同济医学院附属协和医院门诊。对象：选择原发性骨质疏松症患者 64 例，男 11 例，女 53 例。

方法 64 例患者随机分为治疗组和对照组，每组 32 例，治疗组给予淫羊藿总黄酮 0.45 g/次，3 次/d，口服治疗；对照组给予骨疏康颗粒 10 g/次，2 次/d，口服治疗，疗程均为 6 个月。主要观察指标：①两组患者治疗前后腰椎(L_1~L_4)，股骨颈，Ward’s 三角，大转子和左髋的骨密度变化。②两组患者治疗前后血清钙、磷和碱性磷酸酶的变化。

结果 64 例原发性骨质疏松症患者均进入结果分析。①治疗组腰椎骨密度明显高于对照组($P < 0.05$)，其他部位两组骨密度相比，差异无显著性意义($P > 0.05$)。与治疗前相比，治疗组骨密度无明显改变($P > 0.05$)，对照组腰椎，股骨颈，大转子和髋部骨密度明显降低($P < 0.05$，$P < 0.01$)。②两组血钙水平均较治疗前明显升高($P < 0.05$)，两组间比较无明显差异($P > 0.05$)；治疗组血磷和血碱性磷酸酶水平与治疗前相比无明显变化($P > 0.05$)。

结论 淫羊藿总黄酮治疗能有效抑制原发性骨质疏松症患者骨密度降低。

P50 The regulation effects of PARS on expression of FGF2 and TGF-b1 in mouse osteoblast

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Aims To investigate the regulation effects of protease-activated receptor 1(PAR1) and PAR4 on the expression of FGF-2 and TGF－b1 in osteoblasts from newborn mouse and in order to explore protective function of thrombin receptor in bone injury or the elderly osteoporosis fracture process.

Methods Primary osteoblastic cell from newborn mouse were culture in the medium containing different concentrations of specifically activate PAR1 AND PAR4 that is synthetic peptides. FGF-2

and TGF－b1mRNA expression were determine by quantitative real time PCR in mouse primary osteoblasts.

Results PAR-1-activating peptide could promote the expression of FGF-2 and TGF－b1mRNA. The effect of PAR-1-activating peptide on the regulation of FGF-2 mRNA expression was much more potential than that of PAR-4AP. However, in the regulation of TGF－β1 expression, the effects of PAR-1AP was similar to PAR-4 AP .

Conclusion This study showed that that thrombin receptor might promote the expression of expression of TGF－b1 and FGF-2 mRNA through PAR-1-dependent pathways and PAR-4 could participate in up-regulated the expression of TGF－b1 in mouse osteoblast.

P51 椎体后凸成形术对相邻椎体影响的初步观察

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目的 通过观察随访利用椎体后凸成形术治疗椎体压缩骨折术后，患椎下一位相邻椎体高度在术前、术后的变化情况，进而为临床治疗提供参考依据。

方法 采用美国 Kyphon 公司提供的微创器械及特制球囊,对我院收治的 70 例骨质疏松性脊柱压缩骨折患者的 85 个椎体行椎体后凸成形术的治疗。术后随访时间为 1～3 年，分别测量患者骨折椎体下一位未骨折椎体术前、术后和末次随访时的高度，以及患者腰背部疼痛变化情况。术前、术后的数据应用 SPSS 13.0 统计软件进行统计学分析，结果用均数±标准差(x±s)表示,配对资料采用 t 检验，设 P<0.05 为统计学差异有显著性。

结果 所有研究对象（n=70）术后疼痛均得到有效控制,VAS 评分从术前的平均 8.39±1.14 分,下降为术后一周的3.42±1.81分，最后随访时的2.67±1.28分，较术前明显下降(P<0.05)；术前、术后复查 X 线片示下一位未骨折椎体的高度未发生明显形态学变化，椎体前缘与椎体后缘高度比值(Ha/Hp)术前(0.953±0.010)与最后随访(0.926±0.031)时点的比较虽存在一定程度的差异，但没有统计学意义(P>0.05)；椎体中线与椎体后缘高度比值(Hm/Hp)术前(0.931±0.019)与最后随访(0.894±0.059)时点同样存在一定程度差异，但无统计学意义(P>0.05)。测量椎体后缘与对照椎体后缘比较(Hp/Hp+1)术后(0.956±0.033)及末次随访(0.949±0.039)与术前比较(0.963±0.029)也没有明显差异(P>0.05)。

结论 对于骨质疏松椎体压缩骨折的患者，应用椎体后凸成形术治疗后能取得满意的疗效，患椎下一位未骨折椎体术后随着时间推移会发生一定程度的畸变，即高度轻度减低，但并不影响患者的生活质量，亦没有明显的再骨折迹象。但对于此类患者应该进行术后的密切随访。

P52 健康成人体成分差异对不同年龄段人群骨密度的影响

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目的 研究探讨健康成人体成分的特点及其对不同年龄段人群骨密度（BMD）影响的差异。

方法 693 例健康体检成人根据性别、年龄进行分组，全身脂肪、瘦组织、骨矿盐质量和全身、腰椎、股骨 BMD 采用双能 X 线骨密度仪(DEXA)进行检测。所有变量资料用 x±s 表示，男女组别间一般情况比较用描述性统计、成组 t 检验，变量间分析用 Pearson 相关分析和多元逐步回归分析（以 P<0.05 为有统计学意义）。

结果 男性脂肪百分比低于女性（22.15±7.12% vs 32.30±6.84%，P<0.01），瘦组织百分比（73.81±6.86% vs 61.19±10.80%，P<0.01）和骨矿盐百分比（4.07±0.47% vs 3.89±0.64%，P<0.01）明显高于女性。Pearson 相关分析显示男性<60 岁全身、腰椎、股骨 BMD 与瘦组织质量、脂肪质量均呈显著正相关，≥60 岁腰椎 BMD 与脂肪质量呈正相关，但瘦组织仍影响着 BMD；女性随年龄增加，各部位 BMD 与瘦组织质量之间相关性减弱， 与脂肪质量相关性增强。多元逐步回归分析证实瘦组织是影响男性和<50 岁女性 BMD 变异的主要因素；在以绝经后女性为主人群，<60 岁女性 BMI 或瘦组织仍影响着 BMD 变异，≥60 岁女性脂肪则决定 BMD 变异。

结论 近年来的研究发现脂肪和瘦组织这两种重要的体质量组成成分对不同性别、不同年龄段人群 BMD 的确切影响，各家报道不一，缺乏对人群进行整体分析的研究。本研究通过对人群的整体研究发现，男性具有较多的瘦组织，是影响男性 BMD 变异的主要因素。女性具有较多的脂肪成分，但对 BMD 影响存在年龄上的差异，只是决定绝经后期（≥60 岁，绝经女性占 100%）女性 BMD 变异的主要因素；而在绝经前女性以及绝经早期（50～59 岁，绝经女性占 92.5%），仍然以瘦组织影响为主。综上，不同性别、不同年龄段人群，瘦组织和脂肪对骨量的贡献不同，瘦组织是 BMD 主要的决定因素，脂肪仅有利于绝经后期妇女和老年男性部分骨骼 BMD 的维持。强调“高体重或肥胖是骨量的保护因素”是片面、不正确的，因为增重带来的过多脂肪所导致的心血管疾病风险增加可能远大于其对骨骼的益处，通过合理饮食、加强体育锻炼增加瘦组织和肌肉力量以增加骨量是对机体更为有利的选择。

P53 体成分与胰岛 B 细胞功能变化对生育期正常糖代谢肥胖女性骨密度的影响

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目的 探讨生育期正常糖代谢肥胖女性体成分、胰岛β细胞功能变化及对骨密度（BMD）的影响。

方法 95 例入选对象根据体重指数（BMI）分成 4 组，上肢、下肢、躯干、全身脂肪质量、瘦组织质量和 BMD 采用双能 X 线骨密度仪(DEXA)进行检测，并行静脉葡萄糖耐量试验（IVGTT）等。通过计算胰岛素曲线下面积（AUCins）、胰岛素急性分泌时相（AIR）来评估早期胰岛素分泌能力，以稳态模型β细胞功能指数（HOMA2-%B）、胰岛素抵抗指数(HOMA2-IR)估测胰岛β细胞功能和胰岛素抵抗情况。统计方法应用双变量相关、偏相关及多元线性回归分析。

结果 随着 BMI 增加，上肢、下肢、躯干和全身脂肪质量、瘦组织质量及 BMD 均呈递增趋势（P < 0.05），其中以脂肪增加更为显著；IVGTT 第 0min 胰岛素(IVGTTins0)、AIR、AUCins、HOMA2-%B、HOMA2-IR 亦呈增加趋势（P < 0.01）。上肢、下肢、躯干、全身 BMD 与 BMI、空腹血糖（FPG）及对应部位瘦组织质量和（或）脂肪质量呈正相关（P＜0.05）；躯干、全身 BMD 分别与 IVGTTins0、AIR、AUCins 和 HOMA2-IR 呈正相关（P＜0.05）。多元回归分析显示 HOMA2-%B、HOMA2-IR 与 BMD 具有线性关系；若方程自变量中同时引入体成分指标,

HOMA2 值则不能进入回归方程，而瘦组织质量均可进入各部位 BMD 方程中，脂肪质量仅可进入上肢、躯干 BMD 方程，标准化回归系数β：瘦组织质量大于脂肪质量。偏相关分析显示，控制体成分因素后，胰岛β细胞功能指标与各部位 BMD 均无明显相关。

结论 以脂肪增加为主的女性肥胖人群所伴随的胰岛素抵抗或β细胞功能代偿对 BMD 益处较小，这种作用可能是体成分改变的间接反映。体成分尤其瘦组织仍然是肥胖女性 BMD 最主要的决定因素。

P54 低频脉冲磁场 PEMFs 治疗骨质疏松症的临床观察

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目的 观察国产 Union-2000 型低频脉冲磁场骨质疏松治疗系统 PEMFs 治疗骨质疏松症的疗效。

方法 选择原发性骨质疏松伴有腰背痛患者 158 名，其中男 62 名，占 41.1%，女 94 名，占 58.9%，年龄平均 58~87 岁，平均 72.6 岁，均符合 1994 年 WHO 推荐的骨质疏松症诊断标准，即用同性别的骨量峰值减去所测得的骨量值（BMD）≥2.5 标准差为骨质疏松。疼痛评估运用疼痛视觉模拟评分法（PCA）。随机分为两组，钙剂+PEMFs 组 118 例，鲑鱼降钙素+PEMFs 组 40 例。钙剂+PEMFs 组：治疗期间口服钙尔奇 D600mg,每天 2 次，连服 30 天；鲑鱼降钙素+PEMFs 组：治疗期间每日鼻喷鲑鱼降钙素（商品名:密盖息鼻喷剂）200IU，每天一次，连用 30 天。两组均为 30 次为一个疗程。治疗结束后 1 个月、6 个月进行 PCA 评估，其中 30 名患者于治疗后 6 个月采用双能 X 线骨密度仪测定腰椎前后位 L2-4。治疗期间随机监测患者的血压情况。

结果 两组共 158 名骨质疏松症患者经过一个疗程 30 次的治疗后腰背痛均有不同程度的缓解,两组治疗后 1 个月、6 个月 PCA 与治疗前相比呈显著下降 P ＜0.01,鲑鱼降钙素+PEMFs 组 1 个月 PCA 分值较钙剂

+PEMFs 组下降更为明显 P ＜0.01。30 名患者治疗后 6 个月的骨密度测定较治疗前均有显著提高（P ＜0.05）。其中 8 名伴有高血压病患者出现血压增高现象，2 例既往有房颤患者复发房颤。

结论 低频脉冲磁场骨质疏松治疗系统 PEMFs 治疗骨质疏松症有明显的疗效，在快速缓解腰背痛和改善骨密度方面疗效显著，开创了物理疗法治疗骨质疏松症的先河，与药物联合应用效果更加明显，其中鲑鱼降钙素+PEMFs 具有较明显的优势。鉴于 PEMFs 对血压和房颤的影响将进一步研究。

P55 强骨胶囊治疗骨质疏松性股骨转子间骨折的临床观察

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目的 探讨强骨胶囊治疗对骨质疏松性股骨转子间骨折患者骨密度(BMD) 及骨折愈合的影响 。

方法 对 59 例原发骨质疏松性股骨转子间骨折患者内固定术后,测定患者股骨颈骨密度值,随机将患者分为治疗组(30 例) 及对照组(29 例) 。治疗组强骨胶囊每次 1 粒(250 mg) 口服,每日 3 次;对照组钙尔奇 D600 片每次 2 片(1200 mg) 口服,每日 1 次,两组共服用药物 3 个月。患者每月行 X 线照片检查,观察骨折断端骨痂生长情况并进行疗效对比;治疗 3 个月后再次测定股骨颈骨密度值并进行比较 。

结果 治疗组治疗 2 个月后,与对照组比较,骨痂形成时间短、数量明显增加,骨皮质增厚;治疗组骨折愈合时间为(9.3 ±2.6) 周,对照组骨折愈合时间(12.4 ±2.8) 周,两组差异有显著性(P < 0.05) ;治疗组骨密度治疗前(0.631 ±0.095) g/ cm2 ,治疗后(0.656 ±0.092) g/ cm2 ,治疗前后差异有显著性(P < 0.05) ;对照组治疗前后无明显差异(P > 0.05) ;两组治疗后比较,差异有显著性(P < 0.05) 。

结论 强骨胶囊治疗骨质疏松性股骨转子间骨折,能促进骨痂提早形成,增加骨痂生成的数量,增加骨密度,改善骨结构,减少卧床时间。

关键词 骨质疏松性骨折;愈合;骨密度;强骨胶囊

P56 Changes in Bone Mineral Density and Bone Turnover in Postmenopausal Osteoporotic Patients Treated with Calcitonin

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Objective To study the changes of bone mineral density and bone turnover in postmenopausal osteoporotic patients treated with Calcitonin in different time.

Methods 102 postmenopausal osteoporotic patients attended our test. All of them received "LELI"Capsules; 72 patients were treated with Elcitonin. Other 30 patients received "LELI" Capsules only. BMD and a series of bone turnover indices were performed before and after medication at 12 and (or) 24 weeks.

Results No significant changes of BMD happened at 12 weeks after treatment with elcitonin (P>0.05). BMD in Lumbar spine 2 ~ 4 increased at 24 weeks Significantly (P<0.05). In control group, BMD of every part decreased, and there was a significant difference in Neck and Wards at 24 weeks (P<0.05). In elcitonin group, the levels of ALP、NTX decreased at 12 weeks, the level of serum BGP increased, while level of urine NTX continued to decrease in 24 weeks (P<0.05). In control group, no changes of all levels happened at 12 weeks. The level of serum ALP, BGP decreased(P<0.05),and level of NTX increased at 24 weeks after treatment in control group (P<0.05).

Conclusion Long-term treatment with elcitonin for 12 weeks can prevent bone loss, increase bone mass for 24 weeks. But Calcium tablet could not prevent the loss of bone.

P57 HX2010A 治疗仪对绝经后骨质疏松的疗效观察

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目的 观察 HX2010A 型骨质疏松治疗系统对绝经后骨质疏松（postmenopausal osteoporosis, PMOP）患者疼痛、骨密度（bone mineral density, BMD）以及骨转换生化指标的影响。

方法 择伴有疼痛症状的 PMOP 患者共 168 例，随机分为 HX2010A 仪器治疗组 85 例和对照组 83 例。对照组：钙尔奇 D600mg（含无机钙 600mg，维生素 D 125U），每天一次，连续服用 3 月。治疗组：在此基础上每天应用 HX2010A 型骨质疏松治疗系统治疗一次，每次治疗过程中按频率 1 为 6 档，频率 2 为 10 档，强度 1 为 5 档，强度 2 为 7 档的参数，输入病人的年龄、性别、BMD T 值后，计算机会自动算出病人应该使用的频率 1、频率 2 档次组合并进行交替治疗，每隔 30 秒自动切换一次，每次治疗 30 分钟。入选病人年龄>45 岁，绝经年限均大于 3 年。两组病人在基线水平无明显差别，p 值均大于 0.05。首先对每个病人进行疼痛分级，0 级：无疼痛，可正常生活；1 级：感到疼痛，但可承受，不影响正常生活；2 级：疼痛明显，有时不能忍受，部分生活受影响；3 级：疼痛不能忍受，常需卧床，生活明显受影响。分别于治疗后 1 月和 3 月调查两组病人疼痛的改善情况。BMD 采用美国 Lunar 公司生产的 DEXA BMD 测量仪，测定非优势侧股骨近端 Femur Neck 和 L2～4 的 BMD（g/m^2）。每次测量前均进行体模测试，BMD 测量的变异系数（CV）在腰椎正位为 0.24%-0.69%。各组分别于治疗前及治疗后 3 个月测定 BMD、骨碱性磷酸酶（bone-specific alkaline phosphatase，BSAP）、骨钙素（bone gla protein，BGP）、尿 I 型胶原 N 末端肽（type I N-terminal peptide，NTX）与尿肌酐的比值（NTX/Cr）、血钙、血磷、和

尿钙。

结果 治疗 1 月后,HX2010A 治疗组疼痛较对照组明显改善(p<0.01),治疗 3 月后,HX2010A 治疗组 BSAP,BGP 较基线水平明显提高（p<0.05)；BMD 虽有提高，但未达统计学差异；尿 NTX/Cr 与基线水平相比没有明显改变。血钙、血磷、尿钙与基线水平相比也无明显的变化。

结论 HX2010A 型骨质疏松治疗系统能显著早期改善绝经后骨质疏松病人的疼痛症状，提高骨形成指标，并能刺激骨形成。对骨吸收指标、血钙、血磷、尿钙无明显的影响，是一种安全有效的 OP 辅助治疗手段。

P58 补肾中药治疗骨质疏松症合并膝关节骨性关节炎的临床研究

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目的 骨质疏松症(Osteoporosis，OP)是一种以骨量减少、骨的微观结构退化为特征，致使骨的脆性增加以及易于发生骨折的全身性骨骼疾病，骨性关节炎(Osteoarthritis，OA) 主要病理特点为关节软骨变性、破坏、软骨下骨硬化，关节边缘和软骨下骨反应性增生、骨赘形成. 两者皆为老年人的常见病、多发病，流行病学调查显示，OP 与 OA 二者并发率在 30％左右，表明二者具有正相关性。研究采用补肾中药方治疗骨质疏松症合并膝关节骨性关节炎，并观察其临床疗效。

方法 1.临床资料 选择 2008.06—2009.06 我院专科门诊，以严重腰背痛，膝痛，下肢无力，行走费力为主诉且符合两者诊断标准的中老年妇女 48 例。应用双能量 x 线骨密度仪，测定第 2-4 腰椎正位椎体骨密度，应用数字减影 X 光机拍摄单或双膝关节正侧位 x 线片，进行诊断和分析。2.方法 应用补肾强督方治疗，主要组成药物有熟地、杜仲、赤白芍、怀牛膝、地鳖虫、骨碎补等，每日 1 剂，水煎取 200ml，早晚分两次服。每个疗程 40 天，连续观察 3 个疗程共 120 天。3.疗效评价 骨密度指标：于治疗前后检测患者 2-4 腰椎正位椎体骨密度。急时相反映物：于治疗前后检测患者 ESR、CRP 水平。症状、体征：观察治疗前后患者症状；全身疼痛评分；活动度评分。

结果 临床疗效：经 4 个月治疗，48 例患者病情有明显好转，其中显效 18 例、好转 28 例、无效 2 例，临床总有效率为 95.83％ ，经统计学处理有显著性差异(P<0. 01)；骨密度变化：治疗前后患者腰椎骨密度增加(P<0. 05)；治疗前后急时相指标 CRP 较治疗前明显下降(P<0. 05)，ESR 下降非常明显(P<0. 01)；治疗前后症状变化治疗后患者的全身疼痛、症状及活动度明显改善(P<0. 01)；

结论 骨质疏松症和膝关节骨性关节炎是一种危害中老年人健康的慢性进行性疾病。随着社会人口的老龄化，两者的发生发病率越来越高。而根据中医的“肾主骨”的理论，可将两种疾病的发病皆归因于肾虚。中医认为肾主骨、生髓，肾精不足，无以化生肾阳、肾阴，肾阳不足，肾失温煦，骨之生长失其动力；肾阴不足，骨失濡养，而质松质脆。肾精渐亏、肾气虚衰、气血不足是导致中老年人骨关节炎和骨质疏松的重要原因。本研究采用补肾中药治疗骨质疏松合并骨性关节炎取得良好效果，本研究将为进

一步探索中医药治疗骨质疏松合并膝关节骨性关节炎提供临床依据。

P59 老年代谢综合征组分对骨密度的影响

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目的 通过检测老年男性代谢综合征（MS）患者骨密度(BMD)的水平，观察代谢综合征患者骨密度的变化并分析各组分对骨密度的影响，为临床更好防治骨质疏松症提供依据

方法 选择 2007-2009 年在我科住院和门诊的老年男性患者 124 例，年龄 72±5.3 岁（61—80 岁），其中 MS 组 62 例，对照组（非 MS）62 例。两组年龄无差异（P＞0.05）。MS 诊断采用中华医学会糖尿病学分会(CDS)建议代谢综合征的诊断标准即具备以下 4 项组成成分中的 3 项或全部者:⑴、超重和(或)肥胖 BMI≥25.0Kg/M2 ⑵、高血糖 FPG≥6.1mmol/L(110mg/dl)和(或)2hPG≥7.8 mmol/L(140mg/dl)，和（或）已确诊糖尿病并治疗者 ⑶、高血压 SBP/DBP≥140/90mmHg，和（或）已确诊高血压并治疗者 ⑷、血脂紊乱 空腹血 TG≥1.7 mmol/L(110mg/dl)，和（或）空腹血 HDL__C＜0.9 mmol/L(35mg/dl)（男），＜1.0 mmol/L(39mg/dl)（女）。

所有患者皆检查跟骨骨密度（BMD）（采用美国 GE 公司 LUNAR-PIXI 双能 X 线骨密度测定仪），采用全自动生化分析仪测定：空腹血糖（FPG），餐后 2 小时血糖（2hPG），胆固醇(TC)，甘油三酯（TG），高密度脂蛋白—胆固醇（HDL__C），低密度脂蛋白胆固醇（LDL C）。并测量血压（SBP/DBP），身高（H）、体重（W）计算体重指数（BMI）。骨质疏松症（OS）诊断采用 WHO（1994）诊断标准。比较两组 OS 发生率，比较 MS 组中 3 组分与 4 组分 BMD 值水平，分析 MS 各组分与 BMD 的相关性

结果 MS 组较非 MS 组 OS 发生率高(23.4% vs 16.2% P＜0.05)，MS 组中 4 组分较 3 组分 BMD 平均值低，但差异无统计学意义(0.397 0.412 P＞0.05)。相关分析表明 MS 骨质疏松患者骨密度值与 BMI 呈正相关（r=0.253），与 FPG，2hPG，血压呈负相关（r=－0.236 －0.265 －0.274），与血脂各指标无相关性。

结论 老年男性 MS 患者 OS 发生率高，MS 中各组分聚集率高则 BMD 值降低，高血糖，高血压等因素与 OS 发生密切相关，控制代谢综合征各组分对防治骨质疏松有积极意义。

P60 Experience of the treatment and diagnosis for hiding osteoporotic vertebra body fracture without radiologic collapse

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Aim We report our experience with patients who presented with osteoporotic vertebral fractures with no visible deformation of vertebral body.

Methods We prospectively analyzed 11 fractures in 8 cases (M3,F5,average 73y) that presented with acute back pain with no initial deformation of the vertebral body on plain radiographs, and later proved to be fresh osteoporotic vertebral body fractures. There were 7 of the 11 fractures occurred on lumbar spine. Of all the 8 patients, 6 patients had been diagnosed to be osteoporosis before and 2 patients were diagnosed to be osteoporosis in the study. All cases met each of the following criteria: 1) The incriminated vertebra appeared normal on initial radiographs (Genant's Grade 0 deformation). 2) The diagnosis of fresh vertebral body fracture was confirmed by MRI. 3) The diagnosis of osteoporosis was made by the combination of established osteoporosis, ruling out of underlying disease, and follow-up. All the patients accepted non-operation treatment include complete rest in bed and anti-osteoporotic medication.

Results At follow-up, radiographs were obtained for 10 of 11 fractures: in 7 cases, the vertebral fracture developed a vertebral collapse (Genant's Grade > 0.5) in a mean of 13 weeks (range 10–18 weeks); in the 1 remaining case, the vertebra remained normal. All cases had a clinically favorable outcome.

Conclusion Osteoporotic vertebral fractures with no sign of vertebral collapse on initial radiographs do indeed exist. They must not be misdiagnosed as malignant lesions. Anti-osteoporotic medication may result in clinically favorable outcome.

P61 中青年糖尿病患者骨量变化与血脂的关系

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研究目的 骨质疏松是一种常见的老年病，血脂紊乱与其常相互伴随出现，而糖尿病是骨质疏松发病的高危因素之一。本文的目的在于研究中青年糖尿病患者与血脂的关系。

方法 本文收集了我院年龄<60 岁的门诊及住院糖尿病患者 80 名，年龄 36～59（52±6.88）岁，身高 153～176（164±7.47）cm，体重 46～104（65±16.5）kg，体重指数为 17.31～37.89（24.25±5.6）；非糖尿病患者 46 名，年龄 22～59（49±8.89）岁，身高 128～182（165±9.3）cm，体重 45～120（66±13.5）kg，体重指数 16.53~45.17（24.26＋4.77），测量两组参与者的骨密度、胆固醇、甘油三酯、高密度脂蛋白、低密度脂蛋白的水平，用 SPSS14.0 进行统计学分析。

结果 将中青年糖尿病组与中青年非糖尿病组的身高、体重、体重指数、骨密度、胆固醇、甘油三酯、高密度脂蛋白、低密度脂蛋白进行比较，两组数据间没有统计学差异。将中青年糖尿病患者身高与

骨密度 T 值、Z 值及骨矿物质含量比较，发现骨密度的 T 值、Z 值与身高无相关性，而骨矿物质含量与中青年糖尿病患者的身高呈不同程度的正相关。在中青年非糖尿病组中发现骨矿物质含量与身高也呈正相关，而身高与腰椎骨密度的 Z 值呈负相关。非糖尿病参与者中体重与腰椎骨密度的 T 值及 Z 值无相关性，而与其腰椎的骨矿物质含量有正相关性。而中青年糖尿病患者的体重与骨密度的 T 值、Z 值及骨矿物质含量均无关。中青年糖尿病组及非糖尿病组的骨密度与胆固醇、甘油三酯、高密度脂蛋白、低密度脂蛋白比较，通过统计学计算发现中青年糖尿病患者与中青年非糖尿病者的骨密度 T 值、Z 值以及骨矿物质含量与胆固醇、甘油三酯水平没有相关性，而中青年糖尿病患者的骨矿物质含量与高密度脂蛋白存在负相关，中青年非糖尿病者的骨矿物质含量与高密度脂蛋白则不存在相关性。

结论 中青年糖尿病患者与非糖尿病参与者的身高与骨矿物质含量均呈正相关。中青年糖尿病患者的骨矿物质含量与高密度脂蛋白存在负相关，而非糖尿病者的高密度脂蛋白与骨矿物质含量没有这种相关性。

P62 血清瘦素水平与超声跟骨骨量的相关性分析

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Objective Study of relationships between serum leptin concentration And quantitetive ultrasonography in calcaneal.

Methods:Totally, 148 subjects Aged 22-89 years, were choosen and bone mineral density(BMD) were measured by quantitetive ultrasonography in calcaneal.Fasting serum leptin concentration of leptin were measured by Enzyme-Linked Immunosorbent Assays. They were divided into osteoporosis and healthy groups according to bone mineral density(BMD) results, their weight, height were measured.

Results serum leptin level was associated with body mass index(BMI) and bone mineral density(BMD).

Conclusions serum leptin concentration was associated with quantitetive ultrasonography in calcaneal.

P63 隐匿性椎体 OP 压缩骨折诊治体会

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目的 目前临床上主要靠观察 x 线平片上有无明显椎体变形（楔形变、双凹征）即椎体塌陷来诊断 OP 椎体骨折，缺乏隐匿性椎体 OP 骨折的资料。本文报告 X 线片无椎体变形但有 OP 椎体骨折病人的诊治体会。

方法 前瞻性研究，2008 年 10 月-2009 年 4 月收集了一组急性腰背痛的老年患者的影像学及病历资料，共 8 个病人 11 处骨折（3 名男性，5 名女性，平均年龄 73 岁）。大部分骨折都发生在腰椎（11 个有 7 个发生在 $L_{1\sim4}$），6 例病人既往已诊断 OP，2 例病人新诊断为 OP。入选标准：1）受累椎体在平片上形态正常（Genant's 评分 0 变形），2）通过 MRI 确诊新鲜椎体骨折 3)通过骨密度检查并排外其它疾病以诊断 OP。本组病人均 保守 治疗：卧床休息 6-8 周后佩戴硬质支具保护下床，抗 OP 药物治疗（鲑鱼降钙素+罗盖全+碳酸钙）并随访 10～18 周。

结果 随访中 7 例病人的 X 线片显示了 11 处骨折中的 10 处，外伤后 13 周时椎体隐匿性骨折发展到椎体塌陷（Genant's 评分大于 0.5）；剩下的 1 例病人 X 线片示椎体形态保持正常。所有的病人临床预后都很好。

结论 外伤之初 X 线片上无椎体塌陷征象的隐匿性椎体 OP 骨折的确存在，类似于隐形应力引起其他骨折，不同于椎体肿瘤骨破坏，抗 OP 药物效果良好，但后期可出现椎体变形。

P64 不同年龄健康男性不同部位骨密度与体成分分析

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目的 探讨不同年龄健康男性不同部位骨密度与体成分的关系。

方法 选择受试对象年龄均在 20－80 岁之间，每 10 岁为 1 年龄组，其中：20－29 岁 28 例，30－39 岁 35 例，40－49 岁 40 例，50－59 岁 42 例，60－69 岁 39 例，70－79 岁 41 例，共 225 例，均检测正位腰椎(L2-L4)、股骨(股骨颈、ward 三角、大转子、转子间)骨密度（BMD），同时测定全身各部位肌肉和脂肪含量，计算各组骨质疏松发生率，找出各部位骨峰值，分析骨密度与对应的肌肉和脂肪含量的相关关系。

结果 各年龄组 BMI 无明显差别，具有可比性。各部位 BMD 均随增龄逐渐降低，30－39 岁组各部位 BMD 均为最高值，且在股骨颈、ward 三角明显高于其他年龄组($P<0.05$)，20－29 岁、40－49 岁、50－59 岁之间各部位 BMD 比较均无明显差别($P>0.05$)，60－69 岁组腰 2－4、股骨颈、转子间 BMD 均明显高于 70－79 岁组($P<0.05$)；各部位肌肉含量均随增龄逐渐降低，30－39 岁组躯干、腿部、总肌肉含量均高于其他年龄组，但与 40－49 岁组比较均无明显差别($P>0.05$)，50－59 岁、70－79 岁组比较在躯干、总肌肉含量有差别($P<0.05$)；各部位脂肪含量随增龄虽有增加趋势，但仅 70－79 岁组躯干、腿部、总脂肪含量较 20－29 岁、30－39 岁组明显增加 ($P<0.05$)，其他年龄组各部位脂肪含量两两比较均无明显差别($P>0.05$)，男性在 40－49 岁组骨质疏松发生率为 5%，50－59 岁组为 13.04%，60－69 岁组 24.39%，

70－79 岁组 41.86%; 多元线性回归分析显示男性 L2-L4、股骨均值 BMD 均与 BMI、所对应的肌肉含量、年龄关系密切，与所对应的脂肪含量无相关性。

结论 男性各部位骨密度均随增龄逐渐降低，无快速骨量丢失期，各部位骨峰值出现在 30－39 岁之间，各部位肌肉含量均与 BMD 有明显相关性，与脂肪含量无关。

关键词 骨密度；男性；体成分；肌肉含量；脂肪含量

P65 不同年龄健康女性不同部位骨密度与体成分分析

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目的 探讨不同年龄健康女性不同部位骨密度与体成分的关系。

方法 选择受试对象年龄均在 20－80 岁之间，每 10 岁为 1 年龄组，其中：20－29 岁 36 例，30－39 岁 43 例，40－49 岁 45 例，50－59 岁 51 例，60－69 岁 48 例，70－79 岁 45 例，共 268 例，均检测正位腰椎(L2-L4)、股骨(股骨颈、ward 三角、大转子、转子间)骨密度（BMD），同时测定全身各部位肌肉和脂肪含量，计算各组骨质疏松发生率，找出各部位骨峰值，分析骨密度与对应的肌肉和脂肪含量的相关关系。

结果 各年龄组 BMI 无明显差别，具有可比性。各部位 BMD 均随增龄逐渐降低，30－39 岁组各部位 BMD 最高，但在腰 2－4、股骨颈、ward 三角与 20－29 岁、40－49 岁组比较均无明显差别(P>0.05)，股骨颈、ward 三角、大转子 BMD 在 40－49 岁与 50－59 岁、60－69 岁与 70－79 岁年龄组两两比较均有明显差别 (P<0.05)；各部位肌肉含量均随增龄逐渐降低，30－39 岁组躯干、腿部、总肌肉含量均高于其他年龄组 (P<0.05)， 40－49 岁组躯干、腿部、总肌肉含量均明显高于 60－69 岁、70－79 岁组(P<0.05)；各部位脂肪含量随增龄逐渐增加，60－69 岁组躯干、腿部、总脂肪含量均明显高于 20－29 岁、30－39 岁、40－49 岁组 (P<0.05)，70－79 岁组各部位脂肪含量明显高于 50－59 岁组 (P<0.05)；女性在 40－49 岁组骨质疏松发生率为 7.5%，50－59 岁组为 26.39%，60－69 岁组为 46.34%，70－79 岁组为 67.44%; 多元线性回归分析显示女性 L2-L4、股骨均值 BMD 与 BMI、所对应的肌肉含量、所对应的脂肪含量、年龄、绝经年限均密切相关。

结论 女性各部位骨密度均随增龄逐渐降低，尤以绝经后 5-10 年为著，存在快速骨量丢失期，各部位骨峰值出现在 30－39 岁之间，各部位肌肉含量、脂肪含量均与 BMD 有明显相关性。

关键词：骨密度；女性；体成分；肌肉含量；脂肪含量

P66 绝经后肥胖 2 型糖尿病患者体成分与胰岛素抵抗关系

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目的 探讨绝经后肥胖 2 型糖尿病患者体成分与胰岛素抵抗的关系。

方法

选择绝经后 2 型糖尿病患者组(DM 组)68 例，按体重指数分为糖尿病非肥胖组（DM-A 组）41 例和糖尿病肥胖组（DM-B 组）27 例。全部受试者均详细记录年龄、身高、体重、绝经年限，双能 X 线吸收测定仪检测正位腰椎(L2-L4)、股骨(股骨颈、大转子、粗隆间)

骨密度（BMD）与全身各部位脂肪、肌肉含量,并进行临床指标测定，分析患者肌肉、脂肪含量与骨密度的相关性，探讨脂肪分布与胰岛素抵抗的关系。

结果 年龄、绝经年限无明显差别（P>0.05）；DM-B 组空腹血糖较 DM-A 组高，但无显著差异（P>0.05），而 DM-B 组空腹胰岛素、胰岛素抵抗指数显著高于 DM-A 组（P<0.05)；DM-B 组腰 2－4、股骨颈 BMD 较 DM-A 组明显增高（P<0.05），各部位肌肉含量二者无明显差别（P>0.05），DM-B 组躯干、总脂肪含量较 DM-A 组明显增加（P<0.05）。直线相关分析显示 DM 组患者年龄、病程、空腹血糖（FBG）、糖化血红蛋白（HbA1c）、绝经年限与 L2-4、股骨均值 BMD 呈负相关；BMI、FINS 与 L2-4、股骨均值 BMD 呈正相关，L2-4、股骨均值 BMD 与各部位相应肌肉含量、脂肪含量呈正相关，肥胖糖尿病患者 FINS、HOMA-IR 与躯干脂肪含量（TKFM）呈正相关。多元线性回归分析显示糖尿病患者的 L2-4、股骨均值 BMD 与年龄、绝经年限、糖尿病病程、BMI、TLM、TKLM 关系最密切。

结论 绝经后 2 型糖尿病患者肌肉含量、脂肪含量均与骨密度有密切相关性，但肌肉比脂肪对骨密度的影响更显著，2 型糖尿病肥胖患者局部脂肪分布明显增加，尤以腹型肥胖为主，可能是导致胰岛素抵抗的重要因素之一。

关键词 2 型糖尿病；骨质疏松；肥胖；体成分；骨密度；胰岛素抵抗

P67 绝经后肥胖 2 型糖尿病患者体成分与骨密度关系

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目的 探讨绝经后 2 型糖尿病患者骨密度与体成分的关系。

方法 选择绝经后 2 型糖尿病患者(DM 组)68 例,绝经后血糖正常女性 (NC 组)73 例。全部受试者均详细记录年龄、身高、体重、绝经年限,双能 X 线吸收测定仪检测正位腰椎(L2-L4)、股骨(股骨颈、大转子、粗隆间) 骨密度（BMD）与全身各部位脂肪、肌肉含量,并进行临床指标测定，分析骨密度与对应的肌

肉和脂肪含量的相关关系。

结果 两组在年龄、BMI、绝经年限无明显差别(P>0.05)；DM 组 FBG、PBG、HbA1c 高于 NC 组(P<0.05)；DM 组 L2－4、股骨颈、大转子 BMD 较 NC 组显著下降 (P<0.05)；DM 组躯干、腿部、总肌肉含量较 NC 组显著下降(P<0.05)；DM 组躯干、总脂肪含量较 NC 组明显增加(P<0.05)。根据骨密度测定结果糖尿病组进一步分为糖尿病骨质疏松组（DM-OP 组）和糖尿病非骨质疏松组(DM-NP 组)：两组年龄、BMI、绝经年限无明显差别（P>0.05)；DM-OP 组 DM 病程、FBG、PBG、HbA1c 明显高于 DM-NP 组(P<0.05)，DM-OP 组躯干、腿部、总肌肉含量均明显低于 DM-NP 组(P<0.05)； 总脂肪含量 DM-OP 组明显高于 DM-NP 组(P<0.05)，其他部位脂肪含量二者无明显差别（P>0.05）。多元线性回归分析显示糖尿病患者的 L2-4、股骨均值 BMD 与年龄、绝经年限、糖尿病病程、BMI、TLM、TKLM 关系最密切。

结论 绝经后 2 型糖尿病患者较正常女性容易发生骨质疏松，绝经后 2 型糖尿病患者肌肉含量、脂肪含量均与骨密度有密切相关性，但肌肉比脂肪对骨密度的影响更显著。

关键词 2 型糖尿病；骨质疏松；体成分；骨密度；肌肉含量；脂肪含量

P68 双能 X 线骨密度仪测量大小鼠身体成份和骨密度精密度的研究

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目的 明确通过双能 X 线骨密度法测定大鼠和小鼠全身和局部身体成份及骨密度的短期精密度，为确定临床科研数据的可信程度奠定基础。

方法 利用双能 X 线骨密度仪（PRODIGY,GE）对 1 只大鼠和 1 只小鼠进行全身体成份和骨密度测定。每只实验动物测量 33 次，分在 3 天进行。在测量期间，保证受测鼠为健康清洁级实验动物，实验动物的体重不受饮食、疾病等因素的影响。每次测试均保证在同一位置，且肢体、躯干的体位保持一致。每进行一次测试后，需将小动物从受测试位置移开，并重新固定在原位置。所有测试均由同一人进行操作。最后计算短期精密度和最小有意义变化。

结果 大鼠头部骨密度、全身骨密度、全身组织、全身脂肪、全身肌肉，全身脂肪占组织比例短期精密度为 1.801%、1.68%、1.05%、6.29%、1.57%、5.86%，小鼠以上部位相应的短期精密度为 4.91%、6.95%、0.95%、9.32%、6.39%、9.16%。其中，变异系数<5%的部位包括大鼠头部及全身骨密度、全身组织和全身肌肉，小鼠的头部骨密度和全身组织。在 80%可信区间范围内，大鼠骨密度最小变化范围头部为±3.26%，全身为±3.04%。小鼠骨密度最小变化范围头部为±8.89%，全身为±12.58%。

结论 双能 X 线测量大鼠身体成分和骨密度的精密度明显好于测量小鼠的精密度。测量获得的大、小鼠骨密度及某些身体成分在一定研究精度前提下能够符合科研需要。

P69 绝经后 2 型糖尿病骨密度变化与相关因素分析

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目的 探讨绝经后 2 型糖尿病骨密度变化与影响因素。
方法 采用双能 X 线骨密度仪（法国 Medlink）测定 30 例绝经后 2 型糖尿病，35 例绝经前 2 型糖尿，34 例绝经后女性 BMD（腰椎 2-4，股骨近端包括股骨颈(Neck)、大转子(Troch)、转子内区(Inter)、髋部总体(TH)和 Ward 三角(FW)处 BMD） ,对 3 组相应部位骨密度进行比较。所有入选者均排除甲状旁腺机能亢进症、甲状腺功能亢进症、Cushing 综合征、骨关节疾病、慢性肝肾疾病、酮症酸中毒及长期卧床病史等，无激素类、维生素 D3 及钙剂用药史。同时测定糖化血红蛋、血糖、胰岛素等，记录身高、体重、病程、绝经年限，计算 BMI、HOMA-IR 等指标进行多元回归统计，分析其与骨密度关系。
结果 绝经后 2 型糖尿病骨密度低于绝经前 2 型糖尿病和绝经后女性骨密度，糖化血红蛋白、病程和绝经年限与骨密度呈负相关。
结论 糖化血红蛋白、绝经年限、糖尿病病程是绝经后 2 型糖尿病骨密度下降的主要原因。

P70 成骨不全---一家系三代五例报道

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目的 探讨成骨不全（OI）家系遗传方式，提高对该病认识。方法：对发现的 OI 家系进行调查,收集临床资料,绘制家系图谱；分析临床特点；复习病因及病理特点，总结诊治进展。
临床资料 (1)临床特征:该家系共 3 代 7 人,临床诊断Ⅰ型 OI 的患者共 5 例，全部存在蓝巩膜；骨质疏松患者 4 例；发生骨折者 3 例；进行性听力下降 2 例；先证者女儿目前证据尚不充分。(2)家系图谱显示遗传方式属于常染色体显性遗传。(3) OI 病因与编码Ⅰ型胶原基因突变有关。病理特点：骨基质内胶原纤维成熟障碍，排列紊乱，难以钙化成骨，骨小梁纤细、稀疏，代之以大量纤维结缔组织。（4）按目前较公认的诊断标准和依据该家系 4 例临床诊断明确，1 例有待于进一步证实；按 Sillence 分型分类标准，该家系成员应属于Ⅰ型成骨不全。（5）钙剂、维生素 D 及二膦酸盐制剂治疗改善患者症状，提高骨密度。
结论 (1)该 OI 家系临床诊断符合Ⅰ型 OI,遗传方式为常染色体显性遗传。(2) 该病目前尚无根治方法，多采用综合治疗，目的是提高生活质量，减低骨折发生率，防止骨骼畸形。二膦酸盐是目前治疗 OI 的首选药物。(3) 产前检查有助于早期发现 OI。

P71 利塞膦酸钠胶囊治疗绝经后妇女骨质疏松症的临床研究

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目的 评价利塞膦酸钠胶囊防治绝经后骨质疏松症（postmenopausal osteoporosis, PMOP）的疗效及安全性。

方法 240 名受试者随机等分入利塞膦酸钠组（A 组）和安慰剂组（B 组）。A 组给予利塞膦酸钠胶囊+碳酸钙 D3 咀嚼片，B 组给予安慰剂+碳酸钙 D3 咀嚼片，整个试验疗程为 12 个月。在治疗前、用药后 6 月末及 12 月末随访，通过对腰椎 2~4 骨密度（bone mineral density, BMD）、髋部 BMD 的测量及骨代谢生化指标：血骨钙素（osteocalcin, OCN）和尿Ⅰ型胶原氨基末端肽/肌酐（urine cross-linked N-telopeptide of collagen typeⅠ/creatine, NTX/Cr）的检测，对有效性进行评估；在治疗前、3 月末、6 月末和 12 月末随访，通过对一般体征、心电图、血常规、尿常规、肝功能、肾功能的观察对安全性进行评估。

结果 治疗结束后，腰椎 2~4BMD 变化率 A 组 8.28%±13.79%，B 组 4.09%±14.60%，组间有统计学差异（P<0.05）；髋部 BMD 变化率 A 组 8.49%±15.58%，B 组 6.84%±18.34%，组间无统计学差异(P＞0.05)。血 BGPA 组下降 2.94±4.73ng/ml，B 组下降 0.53±3.90ng/ml；尿 NTX/CrA 组下降 9.38±65.93nMBCE/mMCR，B 组升高 3.59±59.86nMBCE/mMCR，两组比较差异均有统计学意义（P<0.05）。治疗期间，A 组发生新骨折 8 例，发生率 7.84%; B 组 6 例，发生率 5.76%，组间差别无统计学意义(P=0.783)。试验过程中未发生与药物有关的严重不良事件。

结论 利塞膦酸钠胶囊能够有效提高绝经后骨质疏松症妇女的骨密度，抑制骨吸收，降低骨转换，不良反应少，用于防治 PMOP 安全有效。

P72 吡格列酮对 2 型糖尿病患者骨钙素、降钙素和骨密度的影响

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目的 探讨噻唑烷二酮类药物吡格列酮对 2 型糖尿病患者骨钙素、降钙素和骨密度的影响。

方法 89 例 2 型糖尿病(T2DM)患者,随机分为 T2DM 对照组 56 例(男性 25 例,女性 31 例,平均年龄 53.26±6.06 岁),T2DM 实验组 33 例（男性 15 例,女性 18 例,平均年龄 52.32±7.32 岁）。在口服降糖药治疗的基础上,实验组加服吡格列酮(30mg/日),疗程 3 个月；正常对照 30 例（男性 13 例,女性 17 例,平均年龄 52.60±8.03 岁）。以双能 X 线吸收测量法(DEXA)测量 T2DM 实验组、T2DM 对照组治疗前后及正常对照组骨密度(BMD)；以放射免疫分析法(RIA)测量 T2DM 实验组、T2DM 对照组治疗前后及正常对照血清

骨钙素(BGP)和降钙素(CT)水平,并进行比较。

结果 ①T2DM 组腰椎、髋部 BMD 均低于正常对照组(1.1217±0.1316 *vs* 1.1877±0.0584；1.0265±0.1170 *vs* 1.0440±0.0506g/cm^2，P<0.05)；②T2DM 实验组经吡格列酮治疗后腰椎及髋部 BMD 均较治疗前有所下降（1.1190±0.1819 *vs* 1.0987±0.1721g/cm^2；1.0299±0.1671*vs* 1.0070±0.1518），差异有显著性意义(P<0.05)；而 T2DM 对照组治疗前后 BMD 变化不大；③T2DM 组血清 BGP 和 CT 均低于正常对照组(3.47±0.78ng/mL *vs* 5.41±1.86ng/mL；26.80±6.79pg/mL *vs* 39.88±13.47pg/mL,P<0.01)；④T2DM 实验组经吡格列酮治疗后 BGP 和 CT 水平均降低(3.55±0.61*vs* 2.62±0.68ng/mL；28.56±6.83 *vs* 17.32±7.37pg/mL),与治疗前比较差异有显著性意义(P＜0.01)；T2DM 对照组治疗前后 BGP 和 CT 水平无明显改变；⑤相关分析显示：BGP 与糖尿病患者年龄及空腹血糖负相关,与髋部及腰椎 BMD 正相关；CT 与糖尿病患者年龄负相关。

结论 ①T2DM 患者血清 BGP 和 CT 低于正常人群，骨转换率减低，骨密度低，存在骨质疏松症风险；②吡格列酮治疗可导致 T2DM 患者血清 BGP 和 CT 水平进一步降低,骨密度下降,提示该药可致骨量丢失加速，对骨代谢有不利影响。

P73 CTR 和 OC 基因多态性与绝经后 2 型糖尿病骨密度关系的研究

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Objective The aim of this study was to explore the distribution of polymorphism in cacitonin receptor gene and osteocalcin gene,and the association of CTR, OC gene in shanghai post-menopausal women with type 2 diabetes.

Methods 218 post-menopausal women and120 health post-menopausal women were recruited in present study. FPG, FINS and HbA1c have been detected, calculated beta cell of islet function index and HOMA-IR. The CTR,OC genotype was determined by polymerase chain reaction and restriction fragment length polymorphism (RFLP). The bone transform biochemical indicator BGP andTRAP-5b have been detected,and at the same time we measured BMD by dual-energy X-ray absorptiometry at $L_{2\text{-}4}$ and femoral neck.

Results The hh genotye was significant higher than Hh genotype and HH genotype in femoral neck BMD ,while there was no significant difference in spine $L_{2\text{-}4}$ BMD between OC genotype and the HH genotype was significant higher than Hh genotype and hh genotype in the level of BGP in the T_2DM group.

Conclusion 1.We speculated that HH genotype was probably an impressionable gene of bone quality descent in the femoral neck in the menopausal type 2 diabetes women.2. we speculated HH genotype was probably an impressionable gene of bone quality descent in postmenopausal women in Shanghai region.

P74 髋部骨质疏松性骨折的围手术期治疗策略

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目的 探讨老年髋部骨折患者围手术期的治疗方法。
方法 回顾性分析我院 2007 年 10 月至 2009 年 7 月 198 例老年髋部骨折患者的病历资料。
结果 本组病人除两例患者因并发多种疾病死亡，其余病人都恢复生活自理能力。
结论 老年髋部骨折患者术前做好充分准备，手术尽量采用创伤小及快速的手术方式，术后正确及时处理并发症，是保证患者康复的关键。

P75 The effect of calcitonin on the bone mineral density in male patients with primary osteoporosis

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Aim This study examined the effect of Elcitonin treatment for 6 months on bone mineral density (BMD) in male patients with primary osteoporosis.
Methods 30 male patients, aged 65±7 years old on average, were diagnosed as osteoporosis by DEXA examination. They were randomly divided into two groups. 15 patients in Group A were given 600mg of oral elemental calcium per day. 15 cases in Group B were injected intramuscularly with eel calcitonin (Elcitonin) 20 units each week on the basis of oral elemental calcium 600mg daily. Two groups were treated for 6 months. Before and after treatment DEXA was employed to detect bone mineral density (BMD) changes in lumbar vertebrae 2~4 (L2~4), femoral neck, Wards triangle and greater trochanter.
Results L2~4 BMD was significantly increased by 3.9±1.2% ($P<0.01$) in Group A patients treated with Elcitonin plus calcium for 6 months. Whearas, it was slightly increased by 1.4±0.8 % ($P>0.05$) in

Group B. The change in L2-4 BMD between Group A and Group B was statistically different (P<0.05). However, BMD in femoral neck, Wards triangle and greater trochanter did not change significantly in either group(P>0.05). Elcitonin was generally well tolerated since only one patient in Group A developed mild facial flushing and nausea.

Conclusion Elcitonin plus calcium used for 6 months in male patients with primary osteoporosis can increase efficiently lumbar spine BMD without any obvious side effects. And its effect on proximal femur BMD needs longer period of observation.

P76 经皮椎体成形术治疗老年人胸腰椎爆裂性骨折的临床观察

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目的 观察经皮椎体成形术治疗老年人胸腰椎爆裂性骨折的效果。

方法 选取 11 例患者，男 5 例，女 6 例，年龄 58～69 岁，平均 65 岁。伤椎共 11 个：胸 $_{12}$椎 4 个、腰 $_{1}$椎 5 个、腰 $_{2}$椎 2 个。所有患者均无神经损害症状、体征。术前均行 X 线、病变椎体 CT 和 MRI,X 线片见伤椎有不同程度塌陷，CT、MRI 片显示爆裂性骨折，椎体后壁不完整，脊髓或马尾神经无压迫(图 1A)。同时据 MRI 了解脊髓圆锥位置,以决定行双侧穿刺还是单侧穿刺。所有病例脊髓圆锥均位于腰 1 椎上下缘之间，是以胸 $_{12}$和腰 $_{1}$椎全部采用双侧穿刺，2 例腰 $_{2}$椎采用单侧穿刺。对 11 例胸腰椎爆裂性骨折患者的 11 个椎体在 C 型臂 x 线透视下经皮椎体穿刺并注入骨水泥成形，术后按疼痛缓解程度根据 VAS 评分进行评估。

结果 11 个椎体中有 9 个采用双侧穿刺，手术时间 0.5-1.0 小时，平均 0.8h。单个椎体平均骨泥注射量平均为 5.8 ml。11 例患者术后 8h 内疼痛均得到不同程度缓解。术后 X 线和(或)CT 复查显示 11 个椎体骨水泥充盈良好(图 2A、B)，2 个椎体因术中侧位透视下单侧注射骨水泥时发现有向椎体外渗漏而停止注射. 术后 X 线和(或)CT 复查显示单侧骨水泥充盈不良：骨水泥渗漏 5 个椎体，其中 3 个椎体前方渗漏者均无临床症状：1 个椎体侧方渗漏无神经根刺激症状；1 个椎管内极少量渗漏但无神经压迫症状。所有患者术后均未发生感染、脊髓压迫和肺栓塞等并发症。11 例患者术后 8h 内疼痛得到不同程度缓解，术后 1 周疼痛缓解优良率为 90. 0%。术后随访 3～12 个月，平均 6 个月，根据 VAS 评分. 患者总体生活质量评分由术前的平均 9.5 分提高到末次随访时的 1.5 分。

结论 经皮椎体成形术治疗老年人胸腰椎爆裂性骨折安全可行，具有良好的止痛效果，有效稳定伤椎，能明显改善患者的生活质量。

关键词 经皮椎体成形术；椎体；爆裂性骨折

P77 **Clinical features analysis in two Progressive Pseudorheumatoid Dysplasia families and identification of two novel WISP3 gene mutations(两个脊柱骨骺发育不良伴进行性骨关节炎家系临床特征分析和 WISP3 基因突变筛查)**

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Objective To characterize the clinical manifestations, features of photography of PPD, screen the mutations of the disease causing WISP3.

Methods Two unrelated families, altogether 4 patients and 49 family members were enrolled. Physical examination and photography were performed in the 4 patients. Peripheral blood samples were collected from these 53 members and 100 healthy controls. PCR was used to examine and sequence the exons and exon-intron boundaries of WISP3.

Results A novel mutation (G46X) in exon 3 of WISP3 was identified in the proband (IV4) of family 1, who is a 13-year-old female, the only daughter of non-consanguineous and healthy parents. She progressed to ankylosis at the age of 10 and presented obvious limitation of motion.In family 2, a nonsynonymous mutation (C114Y) in exon 3 was identified in the three patients. The proband (IV7) in family 2 is a 14-year-old male, the third son of consanguineous parents. One month before he came to our department, he complained hip pain, difficulty in elevating his legs and associated with instability of gait. The boy has two sisters, one (IV5, a 19-year-old female) with normal phenotype, however, the other sister (IV6), a 16-year-old female, had similar manifestations to him.Another patient in this family is the proband's older female cousin (IV8), a 15 years old girl. She is the first daughter of non-consanguineous parents and has a normal little brother.

Conclusion the novel G46X and C114Y mutation in exon 3 in WISP3 were responsible for PPD in Chinese patients. G46X mutant has more severe symptoms and the age of onset was earlier than the C114 mutant. Patients with C114Y mutation had progressive symptoms as they age and lower lime affected most. At the meanwhile, it seemed that the symptoms in female were more severe than in male. Moreover, many obligate carriers were found in family 2, there maybe exists a founder effect in the locality where the family 2 members lived.

P78 **一个低磷酸酶症家族报告及 TNSALP 基因突变检测**

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研究目的 低磷酸酶症是常染色体遗传罕见代谢性骨病，由美国 Whyte 教授首次报告，以骨骼矿化障碍和组织-非特异性碱性磷酸酶活性（tissue-nonspecific alkaline phosphates, TNSALP）缺乏为特点，临床表现为佝偻病/骨软化、血碱性磷酸酶（ALP）水平显著降低或者检测不到。临床分为五型：致死型、婴儿型、儿童型、成人型和牙齿型低磷酸酶症。已经阐明 TNSALP 是该病的致病基因，中国尚无该病例报告。本研究报告一个低磷酸酶症病例临床特征和检测 TNSALP 基因突变的结果。

方法 病例收集：先证者，女性，20 岁，因“双膝外翻畸形伴疼痛 10 年”就诊，非近亲结婚，足月顺产，第一胎，第一产，出生后 6 岁被发现生长迟缓、个矮，10 岁后渐出现双膝外翻畸形伴疼痛。查体：身高 137cm，体重 35kg，双膝外翻。X 线检测提示：双股骨上端有对称性假骨折、骨盆畸形和双膝外翻畸形。查血钙、磷、PTH、肝肾功能、血气分析均正常，血 ALP 值为 8U/L（正常值为 15-112U/L）。13 岁月经初潮，周期正常。父母亲和一妹妹均健康，家族中无类似病史。提取先证者和家族成员基因组 DNA，进行 TNSALP 基因突变检测。

结果 先征者存在 TNSALP 基因突变，为 TNSALP 基因编码区纯合突变，为新发现的突变位点，导致氨基酸序列改变，父母亲为杂合携带者，其妹妹也是杂合子。同时，检测了 50 例健康人无该突变位点。

结论 本研究在国内首次报告由 TNSALP 基因突变导致的低磷酸酶症，属于隐性遗传方式。

P79 Hajdu-Cheney 综合征一例并文献复习

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研究目的 Hajdu-Cheney 综合征也称为遗传性骨发育不良并肢端溶骨症，于 1948 年和 1965 年分别由 Hajdu 和 Cheney 两位放射科医生进行了病例报道。此后的几十例病例既有呈常染色体显性遗传，也有散发病例。国内仅 2 例报道。该病是一种累及患者骨骼生长并且逐渐出现指趾末端骨骼溶解的罕见综合征。对该病的病因学研究十分有限，仅 1 篇文献发现患者 NOG (noggin)基因存在突变。此次我们报道新发现的一例 Hajdu-Cheney 综合征患者，进行相关文献的复习，对三个基因展开病因学研究，并探讨该疾病的治疗方案。

方法 本例报道中的患者，女性，58 岁。因“腰背疼痛 1 年”就诊。患者父母非近亲婚配，智能发育正常，第二性征正常，18 岁月经初潮，周期规律，已婚未育，50 岁绝经。其父母及 4 个弟妹均正常。患者自幼出现骨骼发育不良、指趾末端增粗的临床表现，身高 152cm，体重 38 公斤。具有耳廓大、下颌小的面部特点。近 2 年出现手指末端疼痛，指趾末端软组织粗厚，假性杵状指，恒牙脱落等病征。我们对其进行了血生化、骨转化指标及多部位的骨骼 X 线的检查。血生化未见异常，头颅，双手、足部 X 线符合 Hajdu-Cheney 综合征的表现，表现为颅缝持续不闭，肢端溶骨，见于末节指、趾骨及部分中节指趾骨，呈吸收表现。胸腰椎及骨盆为骨质疏松表现，多个胸腰椎呈压缩性骨折。DXA 检测骨密度：全

髋部 T 值为-3.5SD。诊断为 Hajdu-Cheney 综合征，给予阿伦膦酸钠（固邦）10mg/日，钙尔奇 D600mg/日治疗，并抽取基因组 DNA，进行 LMNA, ZMPSTE24, NOG 基因所有外显子区的核苷酸测序。

结果 对患者的 LMNA, ZMPSTE24, NOG 基因进行的检测，均并未发现上述基因存在突变。该患者给予钙剂及阿伦膦酸钠治疗半年，疗效显著，腰背等疼痛症状改善明显，活动能力提高，髋部骨密度显著提高，增加 6.6%。目前继续此方案治疗，随访中。

结论 此次对于 Hajdu-Cheney 综合征的病因学研究，未发现突变位点，证实了双膦酸盐是治疗 Hajdu-Cheney 综合征的有效药物。

P80 2 个 Lowe 综合征家族与 OCRL1 基因突变报告

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目的 Lowe 综合征又称眼脑肾综合征(oculocerebrorenal syndrome of Lowe)，是一种侵犯眼睛、神经系统和肾脏等多系统病变的综合征。发病率约为 1/500,000。临床可表现为先天性白内障、生长发育迟缓、智力落后、全身肌张力低下、类似范可尼综合征的代谢紊乱以及低磷性佝偻病等。本病为 X 连锁隐性遗传病，位于 X 染色体长臂 (Xq26.1) 的 OCRL1 基因发生突变，使其编码的高尔基体反面的网络结构中的磷脂酰肌醇 4,5 二磷酸 5 磷酸酶发生改变从而致病。在此报告 2 个 Lowe 综合征家族和 OCRL1 基因突变结果。

方法 描述 2 个 Lowe 综合征家族 3 例患者临床表现、实验室检查等特点；对 2 例先证者及其家系成员的 OCRL1 基因进行突变位点检测。

结果 例 1 患者，男，8 岁，有先天性白内障病史，生长发育、智力均落后于同龄儿童；显著的肾脏漏磷、漏糖、漏蛋白等类似范可尼综合征代谢紊乱表现，并引起右下肢 O 型腿改变、左下肢 X 型腿改变、X 线示胫腓骨远端干骺端杯口征等佝偻病样改变，且血磷低，血碱性磷酸酶显著升高，其父母非近亲结婚，健康。例 2 患者，男，26 岁，身高 145cm，智力发育尚可，幼时有先天性白内障病史。具有典型的肾脏漏磷引起的低血磷性骨软化症表现，其父母体健，非近亲婚配，二个姐姐健康，但一弟（例 3，24 岁）有低磷性骨软化症表现，无白内障，智力正常。对患者及其家族成员进行 OCRL1 基因突变检测，分别在例 1 患者和例 2 患者的 OCRL1 基因发现外显子 10 无义突和外显子 24 插入突变。同时 2 个家庭健康母亲为突变携带者。以上 2 例患者目前正在治疗随访中。

结论 1. Lowe 综合征与低磷性佝偻病/骨软化症具有类似的临床表现，必须加以鉴别。2. OCRL1 基因突变检测可确诊 Lowe 综合征

P81 食物对双能 X 线测量腰椎体模结果影响的比较研究

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目的 评价食物对双能 X 线（dual X-ray aborptiometry, DXA）测量腰椎体模结果的影响。
方法 在 GE-Lunar 和 Hologic 腰椎体模上放置流食、半流食、全食及不放置食物时，分别行 DXA 测量体模密度，每组体模连续测量 8 次，分析不同性状的食物对 DXA 测量体模密度结果的影响，并根据最小变化有意义值判断结果的有效性。
结果 在 GE-Lunar 和 Hologic 腰椎体模上放置不同性状的食物与不放置食物时测得的密度值间均有显著性差异，$P<0.05$，且以全食对体模密度值的影响最大，即在 GE-Lunar 和 Hologic 腰椎体模上放置全食时测得的密度值分别比不放置食物时增加 0.0174g/cm2 和 0.0191 g/cm2,且均大于 0.0166 g/cm2 和 0.0155 g/cm2 最小变化有意义值。
结论 双能 X 线测量腰椎体模的结果受食物影响。

P82 经皮椎体后凸成形术治疗骨质疏松性脊柱压缩骨折再发骨折的相关危险因素分析

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目的 分析经皮椎体后凸成形术（PKP）治疗骨质疏松性脊柱压缩骨折后再发骨折的相关危险因素。
方法 自 2005 年 1 月至 2008 年 6 月，作者行 PKP 手术治疗骨质疏松性椎体压缩骨折并有完整资料记录的患者 98 例 163 个椎体，其中男性 22 例，女性 76 例；节段分布：T_6~T_{10} 71 例，T_{11}~L_1 57 例，L_2~L_5 35 例。记录患者的年龄、体重指数（Body Mass Index,BMI）、骨密度(Bone mineral density,BMD)、治疗节段数、单或双侧强化、骨水泥椎间盘外溢情况、骨水泥注射量、术后残留后凸角。分为 2 组：无再发骨折组和再发骨折组，采用生存分析并通过 Kaplan.Meier 法计算结果,对组间变异因素进行统计学分析。
结果 84 例（随访率：85.7%）患者获得平均 24.3±9.8 个月（13~38 个月）的随访；共 16 例（19%）患者出现再发骨折，其中邻近节段骨折患者 12 例，非邻近节段骨折患者 4 例；单侧穿刺强化 62 例中 11 例（17.7%）出现再发骨折，双侧穿刺强化 22 例中 5 例（22.7%）出现再发骨折。术中是否单或双侧穿刺强化、骨水泥注射量的多少并不增加再发骨折的风险。随着年龄、治疗节段、体重指数和术后残留后凸角的增加，再发骨折的风险随之增加。Kaplan.Meier 分析 1 年内再发骨折率为 12.3%，骨水泥椎间盘外溢和低 BMD（$BMD<0.8g/m^3$）明显增加了再发骨折的风险。
结论 椎体压缩后楔形变，导致脊柱生理曲度改变，高体重指数、低 BMD、骨水泥椎间盘外溢明显增加

了经皮椎体后凸成形术后相邻椎体再发骨折的风险。

P83 骨质疏松与主动脉硬化的关系

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目的 探讨老年骨质疏松与动脉硬化的关系。
方法 测定 100 例老年患者（60~93 岁）血脂、碱性磷酸酶（ALP）、血钙、血磷、高敏 C 反应蛋白（hs-CRP）。用双能 X 线骨密度仪测定腰椎（L2-4）、股骨颈、大转子及 Ward’s 三角骨矿密度（BMD）。用高分辨率彩超测定颈动脉内中膜厚度(IMT)。
结果 骨质疏松组年龄、hs-CRP 和 IMT 均较非骨质疏松组高（均 P<0.05），两组性别、体质指数（BMI）、血脂、ALP、血钙和血磷差异无统计学意义（均 P>0.05）；主动脉硬化组年龄、hs-CRP 和 IMT 均较非主动脉硬化组高（均 P<0.05），而 L2-4、股骨颈及大转子 BMD 均较非主动脉硬化组低（均 P<0.05），两组性别、BMI、血脂、ALP、血钙和血磷差异无统计学意义（均 P>0.05）；相关分析表明 L2-4、股骨颈、大转子及 Ward’s 三角 BMD 与颈动脉 IMT 呈负相关（均 P<0.05）。
结论 骨质疏松与动脉硬化密切相关，炎症反应可能是骨质疏松与动脉硬化发病机制的共同基础。

P84 低密度脂蛋白受体 2 基因 5 个标签 SNP 与男性峰值骨量的关系

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研究目的 通过在健康成年男性中对低密度脂蛋白受体 2 基因（low density lipoprotein receptor 2，LRP2）5 个标签 SNP 的鉴定，明确其是否与汉族男性峰值骨量有关。
方法 利用 Hapmap 公共数据库，选择位于 66 号和 69 号外显子的 rs2075252 和 rs4667591 以及 1 号、3 号和 48 号内含子的 rs2389557、rs2544381 和 rs10210408 五个标签 SNP，对 404 例 20-40 岁健康无相关血缘男性（汉族，平均年龄 30.3±6.1 岁）进行鉴定。同时使用双能 X 吸收仪（DXA）测定腰椎 1-4、左股骨颈及全髋部骨密度。
结果 5 个标签 SNP 的分布频率分别为：rs2389557 位点 TT 基因型 29.2%（118 例）、CC 基因型 23.5%（95 例）、CT 基因型 47.3%（191 例）； rs2544381 位点 GG 基因型 53.3%（215 例）、CC 基因型 7.2%（29 例）、GC 基因型 39.5%（160 例）；rs2075252 位点 AA 基因型 35.6%（144 例）、GG 基因型 16.8%（68 例）、GA 基因型 47.5%（192 例）；rs4667591 位点 TT 基因型 39.7%（160 例）、GG 基因型 16.1%(65

例)、TG 基因型 44.2%（179 例）和 rs10210408 位点 TT 基因型 13.9%（56 例）、CC 基因型 33.2%（134 例）、TC 基因型 52.9%（214 例）。各位点基因频率符合 Hardy-Weinberg 定律。其中 rs2389557 位点与经年龄和体重调整后的腰椎 1-4 骨密度呈显著相关性（$p<0.05$），CC 基因型腰椎 1-4 骨密度为（1.165±0.142）g/cm^2，明显高于 TT 基因型的（1.143±0.136）g/cm^2和 CT 基因型的（1.123±0.137）g/cm^2。其余位点 SNP 与腰椎 1-4、股骨颈和全髋部的骨密度均无相关性。

结论 LRP2 基因多态性可能与中国汉族男性峰值骨量有关，此基因可能在骨质疏松发病中起一定的作用，值得深入研究。

P85 comparison of body composition prediction accuracy between two bioelectric impedance consumer devices and body composition values between Chinese and Caucasian

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Objective To compare body composition estimation accuracy of two single-frequency bioelectrical impedance analysis (BIA) consumer devices for healthy Chinese, to compare the body composition parameters between Chinese and Caucasian.

Methods Fat mass percentage (%FM), skeletal muscle mass percentage (%SM), total body bone-free lean mass (TBBLM) and level of visceral fat mass (VF) of 200 Chinese adults (102 females, 98 males, age 47.5±15.4 years, BMI 25.0±3.6 kg/m2) were estimated by Omron HBF-359 (SF-BIA8) and Tanita BC-532 (SF-BIA4), and compared with which measured by MRI and DXA. Bland-Altman and simple linear regression analyses were used to determine agreement between methods. BMI and body composition of this group of Chinese were also compared with those of a group of Caucasian.

Results SF-BIA8 showed similar and high correlation coefficient with DXA for %FM prediction (r=0.89), but relatively lower correlation coefficient with MRI for %SM prediction (r=0.85), compared with SF-BIA4 (r=0.90 for %FM, r=0.97 for TTBLM). All BIA results showed good relative agreements with DXA and MRI for the assessment of %FM and %SM /TTBLM. Both BIA devices provided small and insignificant mean biases but wide limits of agreement with MRI for VFlevel assessments. Systematic errors were observed using SF-BIA8 to assess both %FM ($r=-0.40$, $p<0.001$) and %SM ($r=-0.23$, $p<0.05$). Compared with Caucasian, Chinese female showed lower BMI and weight of total body bone-free mass, similar fat mass percentage but higher level of visceral fat, and Chinese male showed higher fat mass percentage, lower weight of total body bone-free mass with similar BMI and level of visceral fat.

Conclusion Both SF-BIA devices are required to improve population-specific prediction equations of fat mass percentage from height, weight, age and impedance to increase the estimation accuracy for Chinese individuals' employments.

P86 维生素 D 受体基因 Tru9Ⅰ多态性与男性骨密度相关性的研究

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目的 观察北京地区部分健康汉族男性维生素 D 受体基因 Tru9Ⅰ多态性位点基因频率分布，分析这一新发现的多态性位点基因型与骨密度的相关性，以探求男性骨质疏松症的遗传易感性。

方法 筛选 2007 年 9 月至 2008 年 5 月长期居住北京地区无血缘关系的 20-80 岁健康汉族男性 230 人，用聚合酶链反应一限制性片段长度多态性(PCR—RFLP)分析法检测这些受试者维生素 D 受体基因 Tru9Ⅰ多态性位点基因型，使用双能 X 线骨密度仪（DEXA）检测盲法随机抽取的 100 例受试者腰椎 2－4 和股骨颈、大转子、wards 三角区的骨密度。

结果 1. 在本研究受试者中维生素 D 受体基因 Tru9Ⅰ多态性位点基因型频率分别为： TT 66.9%、Tt 30.5%、 tt 2.6%，符合 Hardy—Weinberg 定律；

2. 40-59 岁年龄段男性在腰椎 2-4 部位 Tru9 Ⅰ多态性位点不同基因型之间骨密度有差异，即 TT 基因型 BMD 较 tt＋Tt 基因型低，方差分析显示差异具有显著统计学意义（P=0.003）；经校正年龄、身高、体重、体重指数影响后，仍显示这种差异具有显著统计学意义（P=0.001）；

3. 其余各年龄段、各部位均出现不同基因型之间骨密度存在有差异的趋势，但尚无统计学意义（P>0.05）。

结论骨质疏松是一个受多基因调控和环境因素影响的全身性骨骼疾病。对于维生素 D 受体（VDR）基因多态性与骨密度的研究结果仍十分有争议。Tru9 Ⅰ多态性位点位于第 8 内含子末端，是 2000 年法国首次发现的一个新 VDR 基因多态性位点。到目前为止尚未见国内外报道 Tru9Ⅰ不同基因型与骨密度相关性的研究。

本研究首次在中国健康汉族男性分析 Tru9 Ⅰ基因多态性与骨密度的关系；北京地区 40-59 岁年龄段健康汉族男性维生素 D 受体基因 Tru9Ⅰ多态性与骨密度之间存在一定相关性，既 T 等位基因与低骨密度相关；维生素 D 受体 Tru9Ⅰ多态性与男性骨质疏松症的关联尚需进一步研究。验证 VDR 基因多态性与骨质疏松相关性的本质关系，从基因水平上进一步认识骨质疏松发病机制和临床防治意义重大。

P87 双磷酸盐对目的性骨改建和非目的性骨改建的影响

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目的：骨改建（remodeling）分为目的性和非目的性骨改建,非目的性骨改建主要是维持体内的钙磷平衡，而目的性骨改建主要是修复骨的微损伤。目前双磷酸盐已被广泛应用于治疗骨质疏松，它通过抑制非目的性骨改建而降低了骨的转换频率，减少了骨量的丢失，但其对修复骨微损伤的目的性骨改建有怎样的影响？本文将探讨双磷酸盐对目的性骨改建和非目的性骨改建的影响。
方法：30 只一岁龄犬按体重随机分成三组（每组雌雄各 5 只）：低剂量组和高剂量组犬分别每天给予口服因卡膦酸钠 incadronate 0.3mg/kg 和 0.6mg/kg,对照组犬给予口服乳糖 12mg/kg/d,所有犬持续给药三年。取左侧第九肋骨进行评估。
结果：两种剂量的双磷酸盐都明显降低了骨的转换频率，都明显增加了微裂隙的数量和密度。与吸收陷窝相邻的微裂隙的数目随双膦酸盐剂量的增加而明显增加,而不与骨吸收陷窝相邻的微裂隙的数目在三个组之间没有明显的差异。并且双磷酸盐的应用明显降低了目的性骨改建的启动值（nobs / nmax ）。
结论：双磷酸盐的应用不仅抑制了非目的性骨改建，而且抑制了目的性骨改建。
关键词 双膦酸盐，目的性骨改建，非目的性骨改建。

P88 伊班膦酸钠间断静脉输注治疗北京绝经后骨质疏松症的疗效

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目的 评价新一代双膦酸盐类药物伊班膦酸钠间断静脉输注对北京绝经后骨质疏松症的疗效及安全性。
方法 研究纳入绝经后骨质疏松女性 60 例，年龄 48~74 岁，绝经年限 3~32 年，随机分为 2 组，治疗组每 3 个月静脉输注伊班膦酸钠 2mg，对照组每周口服阿仑膦酸钠 70mg，疗程 12 个月。疗效指标为腰椎及髋部骨密度（采用双能 X 线骨密度仪测量）、骨吸收指标血 I 型胶原羧基末端肽（酶联免疫吸附法测量）及骨形成指标碱性磷酸酶（自动分析仪酶法检测）。安全性指标包括血尿生化指标、心电图及不良反应。
结果 59 例患者完成研究。治疗 12 个月后，伊班膦酸钠组腰椎 2-4、股骨颈及大转子骨密度增幅达 6.3%，2.5%和 0.1%（腰椎 P <0.001，股骨颈 P <0.01）。阿仑膦酸钠组腰椎、股骨颈及大转子骨密度改变率为 3.7%，4.9 和-0.5%（腰椎和股骨颈 P <0.001）。两组间治疗前后骨密度均无明显差别。伊班膦酸钠和阿仑膦酸钠治疗后 ALP 及 CTX 浓度均快速、显著下降，ALP 降低 15.8%和 17.2%，CTX 降低 78.1%及 43.2%（均 P<0.001）。两组血钙磷水平、肝肾功能在正常范围内，伊班膦酸钠组常见的不良反应是首次

输液后肌肉疼痛和低热，占 26.7%，反酸、上腹不适是阿仑膦酸钠组主要的不良反应，占 13.3%，患者可以耐受这些轻度的不良反应。

结论 新一代双膦酸类药物伊班膦酸钠对于治疗绝经后骨质疏松症是安全而有效的。

关键词：骨质疏松症；伊班膦酸钠；阿仑膦酸钠

P89 骨转换率决定了骨的骨矿化程度和微损伤累积程度

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目的：骨密度和骨质量决定了骨的强度，而影响骨质量的因素包括骨转换率、骨的空间微结构、骨单位的矿化程度、微损伤的累积程度以及矿盐和胶原的比例等。那种影响因素起着决定性作用，它们是怎样的相互影响关系？本文利用犬肋骨对骨转换率、矿化程度和微损伤程度进行了测定，并对它们的关系进行了分析。

材料和方法：取十只四岁龄成年猎狗（五雄五雌）的左第九肋骨，用 1%的品红染色后包埋在甲基丙烯酸甲酯中，垂直皮质骨纵轴横切，制备 100μm 厚的非脱钙骨磨片，分成内侧和外侧，进行骨单位的平均矿化程度的测定，组织形态计测学的测定和微损伤所致的微裂缝长度，密度进行测定和统计分析。

结果：内侧骨皮质的骨转换率高于外侧。骨单位的平均骨矿化度外侧高于内侧，外侧矿化度高的骨单位多于矿化度低的骨单位，而内侧相反。对于微裂缝的长度、密度以及微裂缝的密度，内侧均多于外侧。束装裂缝的密度都是内侧小于外侧，而层间分离和骨水泥线裂缝的密度均为内侧多于外侧。但是各种微裂缝的长度在离骨内外两侧的相倚无显著统计学差异。

结论：骨转换率是影响骨质量的决定性因素，肋骨外侧的低转换率使骨单位有较长时间的矿盐沉积，导致了高的矿化程度。而高矿化的骨单位吸收外力的能力将减弱从而导致了加多的微裂出现。

P90 二膦酸盐在佐剂性关节炎中的软骨保护作用

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目的 研究二膦酸盐在大鼠佐剂性关节炎中对软骨的保护作用。

方法 160 只 7 周龄雌性 Lewis 大鼠随即分为 4 组：正常对照组(NV)，关节炎对照组(SV)，小剂量治疗组(SI-10)和大剂量治疗组(SI-100)。除正常对照组外，其余三组均通过鼠尾注射弗氏完全佐剂致敏。致

敏后，大鼠每周 3 次皮下注射空白对照，10 或 100μg/kg/d 因卡膦酸钠。分别在致敏后 2、4、6 和 10 周处死大鼠，分别评估其前腿和后腿关节情况。

结果 4 周时 SV 组可见后腿关节软骨破坏和软骨下骨骨丢失明显。但 SI-10 和 SI-100 组关节软骨破坏较轻。破骨细胞数、血清 IL-6 和唾液酸的水平明显降低。6 周时，各组后腿关节软骨破坏均很严重。但 SV 组前腿关节软骨破坏和软骨下骨骨丢失较其它组严重，软骨细胞凋亡数较其它组明显增加(P<0.05)。NV 组和 SI-100 组没有明显差异(P>0.05)。10 周时，SV 组关节软骨破坏程度和软骨细胞凋亡数与其余各组有显著性差异(P<0.05)。其余三组之间没有显著性差异(P>0.05。)

结论 在佐剂性关节炎的治疗中，二膦酸盐不仅抑制破骨细胞功能保护软骨下骨，还降低血清炎症因子水平、减少软骨细胞凋亡和软骨基质的丢失，从而起到保护关节软骨的作用。

P91 原发性甲旁亢手术及药物治疗对骨代谢的影响

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目的 观察原发性甲状旁腺功能亢进(PHPT) 患者手术治疗后骨病症状及体征改善情况，术后二膦酸盐治疗对患者骨代谢病变的疗效。

方法 回顾性研究，36 例 PHPT 患者:I 组 25 例为手术后未用二膦酸盐治疗女性患者；II 组 11 例为手术后服用二膦酸盐（福善美 70mg,每周一次）治疗女性患者。所有患者术前均有不同程度骨痛，骨骼畸形，行走困难，13 例有多处骨折及 9 例有泌尿系统结石。分别于手术前及手术后半年、1 年检测骨密度和骨代谢指标：血清钙、磷、碱性磷酸酶、甲状旁腺激素、骨钙素等。

结果 ①I 组患者术后 3 个月骨痛明显减轻直至消失,19 例患者由术前不同程度的跛行、行走困难在术后半年恢复正常步态,2 例患者由术前不能行走在术后 6～7 个月能拄拐缓行；II 组患者经福善美治疗后 1 个月左右疼痛明显减轻，4 例患者的跛行和行走困难术后 4 个月左右基本恢复正常步态，骨病症状减轻及功能恢复均较 I 组早。②两组患者术后半年骨量都明显增加,I 组腰椎骨量达 5.3%，股骨总骨量达 4.9%，1 年后腰椎骨量达 14.4%，股骨总骨量达 11.7%（P ＜ 0.01)；II 组腰椎骨量半年时达 6.5%，股骨总骨量为 5.4%，1 年后腰椎骨量达 16.7%，股骨总骨量达 12.8%（P ＜ 0.01)。③两组患者手术后 1 年患者血 PTH、血钙均降至正常范围(P ＜ 0.01) ,碱性磷酸酶、骨钙素较术前明显下降(P ＜ 0.01) ，血磷较术前上升(P ＜0.01) 。

结论 PHPT 是对骨骼有严重危害的疾病, 主要病变为骨量丢失,骨骼畸形，骨囊性变及多发性骨折等。手术是 PHPT 治疗的前提,手术可减轻原发性甲状旁腺功能亢进对骨骼的影响,术后二膦酸盐治疗可加速骨量恢复。因此早期诊断、及时手术、术后及时的抗骨质疏松治疗可有效的预防和治疗 PHPT 对骨骼的危害。

P92 鲑鱼降钙素治疗骨质疏松症患者骨痛的疗效及安全性分析

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目的：观察鲑鱼降钙素对骨质疏松症患者骨痛症状的疗效及安全性。
方法：将 60 例骨质疏松症患者随机分为治疗组及对照组，治疗组使用钙尔奇-D 及鲑鱼降钙素，对照组使用钙尔奇-D，观察点为 0 周、2 周及 4 周。
结果：治疗组两周时缓解 75%及以上者占 86.7%，四周时全部患者疼痛均缓解 75%及以上，对照组两周时缓解 75%及以上者有 13.3%，四周时缓解 75%及以上者有 20%。治疗期间均无严重不良反应。
结论：鲑鱼降钙素治疗骨质疏松症患者骨痛的安全有效，鼻喷剂较针剂副作用低。
关键词 鲑鱼降钙素 骨质疏松症 骨痛

P93 绝经后妇女骨质疏松与骨关节炎的相关性研究

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目的 探讨绝经后妇女骨质疏松与骨性关节炎相关性因素。
方法 门诊随机抽取 200 名绝经后骨质疏松症患者进行骨性关节炎检查，年龄 55-80 岁，平均 65.7±6.67 岁；随机抽取 200 名绝经后女性骨性关节炎患者进行骨质疏松检测，年龄 55-81 岁，平均 66.3±7.31 岁。经双能 X 线骨密度测定，诊断为骨质疏松症的患者（腰部或髋部 BMD 减少 T<-2.5SD）分别进行腰椎和左膝关节 X 线拍片及相关临床检查，另 200 名诊断为骨性关节炎患者（符合 Kellgren 和 Lawrence 骨性关节炎诊断标准）分别进行腰椎和左髋的双能 X 线骨密度测定。通过年龄，身高，体重，BMI，BMD 等比较，分析绝经后妇女骨质疏松患者骨性关节炎的伴发情况及骨性关节炎患者骨质疏松的伴发情况。
结果
1. 两组患者骨质疏松与骨性关节炎比例：根据 Kellgren 和 Lawrence 提出的骨性关节炎诊断标准，200 名骨质疏松症患者中有 113 人患有Ⅱ度及以上的骨性关节炎，而在 200 名骨性关节炎的患者中有 56 人腰椎或髋部骨密度下降 T 值低于-2.5SD，诊断骨质疏松症。
2. 患者年龄变化观察：年龄增加骨质疏松和骨性关节炎的发生率均上升。
3. 患者体重指数分布观察：骨性关节炎患者，体重指数低区域同时伴发骨质疏松的比例明显增加，而骨质疏松症患者中体重指数较高区域同时伴发骨性关节炎的比例明显上升。
4. 患者腰椎和髋部 BMD 比较：骨质疏松组：腰椎 BMD，OP/OA 组明显升高，与 OP 组比较有显著性差异，

OP 组与 OP/OA 组髋部 BMD 均减少，两组无明显差异；骨性关节炎组：OA 组与 OA/OP 组腰椎 BMD 接近正常，两组无明显差异；髋部 BMD，OP 组显著下降，两组有显著差异。

结 论 骨质疏松和骨性关节炎是临床最常见的两种退行性骨关节疾病，它们的病理变化不同，但都与遗传和环境等因素密切相关。绝经后妇女随年龄增高骨质疏松与骨质增生伴发率上升。骨质疏松患者若体重指数较高应警惕骨性关节炎的发生，而骨性关节炎患者若体重指数较低应注意骨质疏松的预防。我们认为，绝经后妇女骨质疏松与骨性关节炎的发生没有必然的相关性。但在老年时，它们可能同时出现或伴发，随着年龄的增大，其伴发率较高。临床中应注重骨质疏松和骨关节炎的同时诊治和鉴别，骨性关节炎患者骨密度测定髋部意义重要。

P94 80 岁以上骨质疏松型股骨颈骨折手术治疗风险叠加因素分析

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目的 人口老龄化已非常普遍，故临床中 80 岁以上高龄人股骨颈骨折发病率逐渐增多；对于这类高龄人员的手术治疗，临床中有许多难点：既要通过手术保证术后早日活动，又要避免手术风险对这类风险人员的风险叠加。本文通过 75 例 80 岁以上高龄人股骨颈骨折病例分析，探讨围手术期准备、手术操作注意、术后康复等相关注意因素。

方法 2006 年 1 月至 2008 年 12 月 75 例（其中 85 岁以上 19 例）股骨颈骨折病例，骨折类型：Garden Ⅳ期；手术方法：骨水泥型人工股骨头置换；术前评估：血压、心功能、血糖、肝肾功能、骨质疏松程度；术后康复：股四头肌等长训练、辅助直立、助行器行走；门诊评估：髋关节功(Haris 评分)。

结果 1 例术后因血压下降抢救后呼吸衰竭死亡；74 例获门诊随访，随访时间平均 25 个月（12 月~30 月），术后平均 6 周恢复基本生活能力；门诊末次随访髋关节 Haris 评分平均 70 分（55~80 分）；围手术期情况：心功能不良 93%（70 例）、糖尿病 77.3%（58 例）、低蛋白 68%（51 例）、脑血栓病史 32%（24 例）、骨质疏松 74 例（髋部 X 线片评价）；手术情况：全麻 6 例、连硬麻醉 69 例、切口均为术髋后外侧切口；人工股骨头均采用骨水泥型，术中均主动输血 2 个单位红细胞悬液，术后均不进行置管镇痛；术后情况：常规单联抗菌素治疗，术后第 2 天起用小分子肝素 1 周，术后 3 天站立，术后 5 天起人工辅助步行器下行走，术后 3 周扶拐活动。

结论 80 岁以上高龄人股骨颈骨折采用骨水泥型人工股骨头置换可达到早期活动效果；这类患者均存在老年性基础疾病，手术前、手术后要充分准备、提前干预；这类病人术后主动和被动功能训练十分重要。

关键字 高龄 骨质疏松 股骨颈骨折 风险因素 分析

P95 经皮椎体成形术病人椎体骨折的临床特点分析

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目的 了解经皮椎体成形术治疗患者椎体骨折的临床特点。
方法 对 2006 年 5 月至 2009 年 6 月间在我院介入血管科行经皮椎体成形术的 309 例病例通过病历查询的方式获取资料，记录患者的性别、年龄、诊断、骨折诱因、慢性病史、手术史、药物治疗等。
结果 在 183 例（59.2%）骨质疏松性椎体压缩性骨折的病人中，女性 153 例，平均 71.69±8.39 岁，男性 30 例，平均 76.17±8.10 岁，男女在年龄上无差别。其中骨质疏松合并高血压者占 24.6%（45/183），合并糖尿病者占 9.8%（18/183），合并类风湿性关节炎者占 6.6%（12/183），合并系统性红斑狼疮者占 1.6%（3/183），合并慢性肾脏病，维持性血透者占 1.1%（2/183），长期使用糖皮质激素者占 3.3%（6/183），术前血清碱性磷酸酶升高者占 19.7%（36/183），病程中使用抗骨质疏松药物者占 20.2%（37/183）。
骨折的诱因中无诱因占所有骨质疏松性椎体压缩性骨折的 47.5%（87/183），跌倒占 32.2%（59/183），负重占 6.6%（12/183），弯腰占 3.8%（7/183），扭伤腰部占 2.7%（5/183），车祸等外伤占 2.2%（4/183），乘车颠簸占 2.2%（4/183），其余为下蹲、下楼、不当活动等造成。
骨折椎体以胸腰椎为主。在骨质疏松性骨折病人中只有 1 个椎体发生骨折的病例占 46.4%（85/183），2 个椎体骨折病例占 23.0%（42/183），3 个及以上椎体骨折病例占 30.6%（56/183）。只进行 1 次经皮椎体成形术的病人占 71.0%（130/183），有其他部位骨折史的病例数占 9.3%（17/183）。
骨质疏松性椎体骨折患者女性多于男性，以胸 12、腰 1、腰 2 椎体骨折多见，多合并高血压、糖尿病、类风湿关节炎、服用激素等慢性病史，骨质疏松骨折的诱因以跌倒为主。在病程中会多次发生多个椎体骨折，需多次手术。
结论 应重视对骨质疏松危险因素的防治，并预防椎体骨折的再次发生。

P96 骨质疏松伴腰椎管狭窄间歇性跛行(NICL)的非手术治疗

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目的 研究探讨降钙素和低频脉冲电磁场治疗骨质疏松伴腰椎管狭窄间歇性跛行的临床效果。
方法 患者 52 例，其中男性 32 人，女性 20 人，年龄 63－75 岁，平均 68.5±5.0 岁，其中 13 人患有脊柱胸腰椎椎体压缩性骨折，10 人患有腰椎滑脱。
（一）、分组与治疗方法

52 名患者随机分成 2 组，A 组（降钙素治疗组）：男 16 人，女 10 人，年龄 63－74 岁，平均年龄 68.2±5.1 岁，补充钙剂（美国，惠氏产品）600mg/天＋降钙素治疗：鳗鱼降钙素(日本，旭化成产品)肌注 20U/天，第一周每天一次，以后每周两次；B 组（低频脉冲电磁治疗组）：男 16 人，女 10 人，年龄 64－75 岁，平均年龄 68.7±4.9 岁，补充钙剂 600mg/天＋低频脉冲电磁场治疗：每周五次，每次 30 分钟，15 次后间隔 1 周再重复。两组观察时间均为 3 个月。

（二）、检测指标

1、 骨密度测定（DEXA）

2、跟骨超声测定（QUS）

2、 间歇性跛行评估：采用曾雌茂计分法对腰腿痛、步行距离、患肢肌力、患肢知觉、膀胱功能和日常生活七项指标进行评价。

4、腰椎 CT 扫描及胸腰椎 X 摄片。

5、不良反应。

以上检测中，间歇性跛行评估分别于治疗前、治疗 1 个月和治疗结束时进行，其余分别于治疗前和治疗结束时进行。

（三）、统计学分析

数据管理采用 EpiData2.0，采用双份独立输入，核对无误后进行统计分析。

结 果 治疗前后两组患者腰腿痛、步行距离、患肢肌力、患肢知觉、膀胱功能和日常生活七项指标的曾雌茂计分法评价，降钙素治疗明显改善骨质疏松伴腰椎管狭窄神经性间歇性跛行患者的临床症状；低频脉冲电磁场可减轻腰腿痛症状，但对骨质疏松伴腰椎管狭窄神经性间歇性跛行的治疗效果不满意。

结 论 降钙素治疗骨质疏松伴腰椎管狭窄神经源性间歇性跛行，不仅可缓解骨质疏松骨痛，改善骨质量，还能增加马尾神经血供，提高步行能力。这种双重治疗是那些不能或不愿接受手术治疗的老年骨质疏松伴腰椎管狭窄神经源性间歇性跛行患者的重要临床选择。

P97 二膦酸盐治疗对骨质疏松性骨痛、骨密度、骨强度的疗效及安全性评价

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目的 观察两种二膦酸盐药物在治疗妇女绝经后骨质疏松性骨痛、骨密度、骨强度及骨折中的作用,评价其疗效及安全性。

方法 202 例绝经后骨质疏松患者简单随机分成 3 组,阿仑膦酸钠(福善美)组 65 例、依替二膦酸盐(依膦)组 67 例和钙尔奇 D(钙剂)组 70 例,治疗 1 年。治疗前后采用双能 X 线骨密度测量仪(DEXA)测量腰椎、髋部骨密度(BMD)及椎骨形态,桡骨、胫骨超声骨密度测定,检测血钙、磷、碱性磷酸酶(BAP)、尿 I 型胶元交联 N 端肽(NTX)。观察骨痛改善程度、骨量变化、骨强度改变、新骨折发生和不良反应。

结果 福善美组和依膦组治疗后骨痛均明显改善,福善美组改善时间7~10天,依膦组约2周左右,钙剂组疼痛变化不明显。福善美组治疗12个月后骨量增加6·9%,依膦组增加3·9%,钙剂组减少0·3%。福善美组桡骨及胫骨超声声速(SOS)值分别增加0·8%和1·2%,依膦组变化不明显,钙剂组则分别下降0·5%和2·9%。福善美组无新骨折发生,依膦组有3例、钙剂组有5例发生新骨折。福善美组和依膦组不良反应主要为上消化道症状,依膦组较明显;钙剂组主要为便秘。

结论 福善美能明显缓解骨质疏松性骨痛,显著提高骨密度,增加骨强度,预防骨质疏松性骨折的发生。

P98 妙奥春颗粒调节性腺轴治疗骨质疏松症

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骨质疏松症是一种以骨量低下，骨微结构破坏，导致骨脆性增加，易发生骨折为特征的全身性骨病。该病可发生于不同性别和任何年龄，但多见于绝经后妇女和老年男性。骨质疏松症分为原发性和继发性二大类。原发性骨质疏松症又分为绝经后骨质疏松症(Ⅰ型)、老年性骨质疏松症(Ⅱ型)和特发性骨质疏松(包括青少年型)三类。

妙奥春颗粒是由临床长期应用中总结而来，以补肾健脾为组方原则，经过多年的临床应用和药物筛选研究而成。我们已经证明，妙奥春颗粒可显著改善胰岛素敏感性，而胰岛素敏感性下降是发生骨质疏松症的重要原因。本实验通过观察老年骨质疏松症患者治疗前后骨密度及睾酮（T）、雌二醇（E2）水平的变化，发现除改善胰岛素敏感性外，妙奥春颗粒还可通过提高性激素水平增加骨密度，达到防治老年骨质疏松的目的。

P99 Factors Influencing Diagnosis and Treatment of Osteoporosis after Fragility Fractures among Women in 7 Asian Countries

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Objectives: To characterize the clinical and demographic characteristics that affects the likelihood of osteoporosis diagnosis and pharmacologic treatments among post-menopausal women after hospitalizations due to fragility fractures in Asia.

Methods: From February 2008 to June 2009,1,148 eligible patients hospitalized due to fragility fractures were enrolled from 7 countries including Hong Kong, Thailand, South Korea, China, Singapore, Malaysia and Taiwan. Participating patients were randomly selected from hospital discharge roll of participating medical centers. Medical history, treatment, prescription drugs use and supplements intake data were collected by face-to-face and telephone interviews and medical charts reviews. Chi-square tests and logistic regression models were applied built to identify significant factors associated with osteoporosis diagnosis and treatment offered.

P100 成骨细胞（MC3T3-E1）在铁调素干预后钙离子及细胞功能变化观察

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目的：初步研究铁调素在骨细胞代谢中对细胞内钙离子浓度和细胞功能的影响。

方法：（1）不同浓度 Hepcidin 干预 MC3T3-E1 细胞后，采用激光共聚焦扫描显微镜(CLSM)观察成骨细胞内的钙离子荧光强度。（2）不同浓度 hepcidin 干预细胞后 RT-PCR 法检测 OPG、BGP mRNA 的表达量。

结果：（1）CLSM 扫描 MC3T3-E1 细胞内钙离子荧光强度显示：a. 实验组细胞内的钙离子荧光强度在加入 Hepcidin 后形成一个瞬时的钙波，钙离子荧光强度有明显增幅，对照组钙离子荧光强度呈现一个缓慢下降的趋势，二者变化趋势有着明显差异。b. 随着胞外铁调素浓度升高，细胞内的钙离子荧光强度增强。（2）铁调素可上调 MC3T3-E1 细胞 OPG 和 BGP mRNA 的表达，且呈一定的浓度依赖性。

结论：（1）铁调素的干预对 MC3T3-E 细胞内的钙离子浓度的影响存在，提示铁调素可能影响着成骨细胞

的功能；（2）铁调素上调 MC3T3-E1 细胞 OPG 及 BGPmRNA 表达，促进骨形成，抑制骨吸收。（3）铁代谢影响因素 hepcidin 的研究为进一步研究骨细胞代谢提供新的思路。

关键词 铁调素；成骨细胞；激光共聚焦扫描显微镜；钙离子

P101 铁调素在骨细胞代谢中对钙离子影响的初步研究

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目的：初步研究铁调素在骨细胞代谢中对钙离子的影响和相关联系。

方法：（1）不同浓度 Hepcidin 干预 hFOB 1.19 细胞后，采用激光共聚焦扫描显微镜(CLSM)观察成骨细胞内的钙离子荧光强度改变。（2）不同浓度 Hepcidin 干预 MC3T3-E1 细胞后，采用激光共聚焦扫描显微镜(CLSM)观察成骨细胞内的钙离子荧光强度改变。

结果：（1）CLSM 扫描 hFOB 1.19 细胞内钙离子荧光强度显示：a. 干预组细胞内的钙离子荧光强度在加入 Hepcidin 后形成一个瞬时的钙波，钙离子荧光强度有明显增幅，对照组钙离子荧光强度呈现一个缓慢下降的趋势，二者变化趋势有着明显差异。b. 随着胞外铁调素浓度升高，细胞内的钙离子荧光强度增强。（2）CLSM 扫描 MC3T3-E1 细胞内钙离子荧光强度显示：a. 干预组细胞内的钙离子荧光强度在加入 Hepcidin 后形成一个瞬时的钙波，钙离子荧光强度有明显增幅，对照组钙离子荧光强度呈现一个缓慢下降的趋势，二者变化趋势有着明显差异。b. 随着胞外铁调素浓度升高，细胞内的钙离子荧光强度增强。

结论：（1）铁调素的干预对 hFOB 1.19 细胞内的钙离子浓度存在影响，提示铁调素可能通过影响细胞内的钙离子浓度影响着成骨细胞的功能；（2）铁调素的干预对 MC3T3-E 细胞内的钙离子浓度存在影响，提示铁调素可能通过影响细胞内的钙离子浓度影响着成骨细胞的功能；（3）铁代谢影响因素 hepcidin 的研究为进一步研究骨细胞代谢提供新的思路。

关键词 铁调素；成骨细胞；激光共聚焦扫描显微镜；钙离子

P102 铁调素对 MC3T3-E1 小鼠成骨细胞骨保护素和骨钙素基因表达的影响

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目的 研究铁调素对小鼠成骨细胞 MC3T3-E1 细胞骨保护素（OPG）和骨钙素（BGP）基因表达的影响。

方法 小鼠 MC3T3-E1 细胞体外培养后，以不同浓度（100nmol/ml，200nmol/ml，300nmol/ml）的铁调素作用 72h，用 RT-PCR 方法检测 OPG、BGP mRNA 的表达水平。

结果 RT-PCR 检测显示在不同浓度铁调素干预后，各组均有 OPG mRNA 和 BGP mRNA 表达；不同浓度组的 OPG mRNA 和 BGP mRNA 表达光密度比值不同，组间密度比值比较存在显著性差异（P<0.05）。

结论 铁调素可上调 MC3T3-E1 细胞 OPG 及 BGP mRNA 表达，铁调素浓度增加转录水平逐渐增加，结果显示有浓度依赖性。

关键词 铁调素；骨钙素；骨保护素；MC3T3-E1 细胞；RT-PCR

Effects of hepcidine on expressions of osteoprotegrin and osteocalcin genes in MC3T3-E1 osteoblasts of mice

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objective To examine the effects of hepcidine on osteoprotegrin （OPG） and osteocalcin（BGP） gene expressions in MC3T3-E1 osteoblasts of mice.

Methods After hepcidine of different concentrations were added in MC3T3-E1 Mice cells cultures in vitro (100nmol/ml, 200nmol/ml, 300nmol/ml) for 72 hours ,we evaluated the expression of OPG, BGP mRNA using RT-PCR.

Results The result of RT-PCR showed that the BGP mRNA and OPG mRNA expression all occurred after the intervention of hepcidine of different concentrations;And the density ratios of OPG mRNA and BGP mRNA shown on RT-PCR differed according to the concentrations ,which demonstrated a significantly statistical difference (P <0.05).

Conclusion Hepcidine upgraded the expression of BGP and OPG mRNA in mice MC3T3-E1 cells , there were a dose-dependent correlation between the concentration of hepcidine and the level of transcription.

Key words Hepcidine；Osteocalcin；0steoprotegrin；MC3T3-E1 cells；RT-PCR

P103 Fixion PF 可膨胀髓内钉治疗老年人股骨粗隆间骨折

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目的 探讨 Fixion PF 可膨胀髓内钉治疗老年人股骨粗隆间骨折的临床疗效。

方法 统计 2001 年 8 月～2008 年 10 月应用 Fixion PF 治疗的老年人股骨粗隆间骨折 148 例,对术中出血量、手术时间、术后骨折愈合时间、功能情况进行统计分析。

结果 手术时间 52-92min,平均 73min ,术中出血 30－230ml,平均出血量 86ml.骨折临床愈合时间为 9－21 周，平均 12.6 周。髋关节功能按 Harris 评分标准评定，平均 91.6 分。

结论 Fixion PF 可膨胀髓内钉具有微创、易操作、固定坚强、并发症少等诸多优点，是治疗老年人粗隆间骨折的有效方法。

关键词 髋部骨折; 可膨胀股骨近端髓内钉; 老年人

P104 Influence of lipid metabolism on bone mineral density and related bone biochemical markers in postmenopausal women

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Objective To investigate the influence of high-density lipoprotein cholesterol (HDL-c) or low-density lipoprotein cholesterol (LDL-c)on bone mineral density(BMD) and the related bone biochemical markers in postmenopausal women, and to further explore the mechanism of the abnormal lipid metabolism on bone metabolism in order to prevent osteoporosis.

Methods Based on the level of lipid, 237 postmenopausal women were divided into 3 groups: low HDL-c group(n=87, HDL-c≤0.91mmol/L), high LDL-c group(n=82, LDL-c≥3.12mmol/L) and control group(n=87). BMD were measured on the lumbar spine 2-4 (L2-4), femoral neck (Neck), Ward's triangle, trochanter (Troch) and Total by dual energy X-ray absorptiometry(DEXA) and the bone biochemical markers including alkaline phosphatase(ALP), 25 hydroxy vitamin D (25(OH)D), tartrate resistant acid phosphatase 5b(TRACP-5b), urine type I collagen N-terminal peptide (NTX) were also measured. The above data were analyzed by SPSS11.5.

Results Between the three groups, the difference of age, menopause duration, body mass index, FSH, LH and E2 were not significant. Compared with the control group, BMD on L2-4, Ward's triangle, Troch and Total of low HDL-c group is lower except for Neck; compared with the control group, BMD on L2-4, Troch and Total of high LDL-c group is lower except for Neck and Ward's triangle. Compared with the control group, TRAP-5b and the ratio of urine type I collagen N-terminal peptide with creatinine (NTX/Cr) of low HDL-c group were higher and ALP, 25(OH)D, urinary calcium and urine phosphorus were no significance; compared with the control group, NTX/Cr, ALP, 25(OH)D, urine calcium and urine phosphorus of high LDL-c group were no significance except that TRAP-5b was higher.

Conclusions Dyslipidemia may reduce bone mineral density and elevate the level of biochemical markers of osteoclasts in postmenopausal women, and thus maintaining the normal lipid metabolism

probably prevent osteoporosis

P105 武汉地区成人骨矿含量、骨密度与骨代谢物的相关研究

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研究目的 测量武汉地区成人骨矿含量（BMC）及骨密度(BMD)值，探索骨丢失的规律，调查武汉地区成人骨质疏松症(OP)的患病率。观察骨密度与骨代谢指标含量表达的变化规律，为预防和诊断骨质疏松症提供科学依据。

方法 从 9000 例健康体检成年人群中随机抽取 5632 例，采取美国 GE 公司双能 X 线骨密度仪（PIXI）测量武汉地区成年人骨密度及骨矿含量，并对其中 208 人测定甲状旁腺激素(PTH)、雌二醇（E2）、瘦素（LP）、骨钙素 (BGP)、碱性磷酸酶(ALP)和血清钙(Ca)等骨代谢指标，对骨密度与各项骨代谢指标进行相关性分析。

结果 1、男性 BMC 和 BMD 达骨峰值年龄均为 20－25 岁，女性达到峰值年龄：BMD 位于 26-30 岁，BMC 位于 41-45 岁；随年龄增加男女两性 BMD 均逐渐下降，同龄男性 BMD 高于女性。2、武汉地区成人骨质疏松症总患病率为 6.11%，其中青年人（age≤40）为 2.64%，中老年人（age＞40）为 7.81%，中老年人群骨质疏松症患病率明显大于青年人；男、女性骨质疏松患病率均随年龄增加而逐渐升高，年龄组发病率之间具有显著性统计学差异（$p<0.01$）；与男性不同的是，女性 50 岁以后骨质疏松患病率开始明显增加，为 7.87%。3、骨密度与瘦素和骨钙素呈正相关关系（r 分别为 0.331 和 0.226），与甲状旁腺素呈负相关（r =-0.307），与其它生化指标之间无明显相关性。

结论 随着年龄增加，武汉地区成人骨密度值逐渐下降，骨质疏松症患病率逐渐升高；骨密度与骨钙素、瘦素与甲状旁腺素之间密切相关。人们加强营养和锻炼，女性应注意围绝经期的补钙和自我防护，从而降低骨质疏松症的发生。

P106 安徽地区 8124 例 DEXA 法骨密度的调查研究

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目的 由于老龄社会的到来,骨质疏松性骨折给病人带来极大痛苦,生活质量下降,对家庭和社会带来沉重负担,因此骨质疏松症受到社会各界的关注。DEXA 骨密度测量可以直接定量了解骨密度情况,为骨质疏松的预防、诊断和治疗提供可靠的依据。

方法 我院于 2002 年 1 月~2009 年 7 月对安徽地区 8124 例健康体检人群及门诊、住院病人采用美国 Lunar 公司的双能 X 线骨密度仪（DEXA）进行腰椎 2～4、股骨近端和前臂的骨密度测量，以 WHO 的骨质疏松诊断标准（即受试者骨密度低于本地区、同性别峰值骨密度 2.5 标准差）为依据筛查他们骨质疏松的患病率，并进行比较。

结果 （1）健康体检人群 5210 例，包括男性 4073 例，女性 1137 例；男性骨峰值出现在 30～34 岁年龄组，骨质疏松症患病率为 9.7%；女性骨峰值出现在 25～29 岁年龄组，骨质疏松症患病率为 15.4%；女性骨质疏松症患病率高于男性（P＜0.01）。（2）2 型糖尿病患者 2173 例，包括男性 1295 例，女性 868 例；男性糖尿病患者骨质疏松症患病率为 10.3%（与健康男性相比差异无统计学意义，P > 0.05），女性糖尿病患者骨质疏松症患病率为 14.9%（与健康女性相比差异无统计学意义，P > 0.05）。(3)甲亢患者 703 例，包括男性 321 例，女性 382 例；男性甲亢患者骨质疏松症患病率为 31.4%（与健康男性相比差异有统计学意义，P＜0.01），女性甲亢患者骨质疏松症患病率为 38.9%（与健康女性相比差异有统计学意义，P＜0.01）。（4）风湿病患者 138 例，包括男性 39 例，女性 99 例；男性风湿病患者骨质疏松症患病率为 22.6%（与健康男性相比差异有统计学意义，P＜0.01），女性风湿病患者骨质疏松症患病率为 44.5%（与健康女性相比差异有统计学意义，P＜0.01）。

结论 女性骨质疏松症患病率高于男性，2 型糖尿病患者骨质疏松症患病率与正常人相似，甲亢、风湿病患者骨质疏松症患病率高于正常人。

P107 骨质疏松骨折药物治疗进展

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骨质疏松骨折的药物选择包括传统的抗骨吸收药物，例如二膦酸盐类，但其胃肠道副作用往往影响其治疗，此类患者可以应用静脉制剂，目前已有每月口服一次的伊班膦酸钠。雌激素是人体（包括男性）骨转换和骨量的重要调节因子。雌激素替代治疗可以提高绝经后妇女的生活质量以及降低骨质疏松性骨折的发生，但 HRT 可增加乳腺癌、静脉血栓栓塞甚至心血管事件的发生率。雷洛昔芬作为最常用的选择性雌激素受体调节剂（SARMs），它对于骨骼和脑组织有雌激素受体激动的作用，而对于乳腺和子宫则有雌激素的拮抗作用。同时可以降低乳腺癌的发生率。大量证据表明，降钙素可以减轻由于骨质疏松性锥体性骨折所引起的疼痛。在日本，每周静脉应用一次降钙素得到推广，它不仅可以预防骨质疏松性骨折而且可以减轻骨痛。促进骨形成药物，如甲状旁腺激素，间断应用小剂量 PTH 促进骨形成。雷奈酸锶作为一种重金属可以在骨中沉积。最近的研究表明雷奈酸锶可以通过增加微环境中钙离子浓度而调节骨细胞上钙敏感受体的活性。研究表明，应用雷奈酸锶 3 年可以减少锥体骨折和非锥体骨折的发生。

目前，Rankl 以及它的自然诱捕受体护骨素已经被证实是破骨细胞骨吸收的最终的效应分子。Denosumab 是一种完全的人类抗 RANKL 单克隆抗体，每 3 或 6 个月给予 Denosumab 是可以耐受的，它可以增加骨密度以及减少骨吸收标记，且最长可持续 24 个月。组织蛋白酶 K 是一种溶酶体半胱氨酸蛋白

酶，在破骨细胞中大量表达。组织蛋白酶 K 抑制剂是预防破骨细胞诱导骨吸收所引起骨质疏松性骨折的新的研究目标。目前已有一些相关的化合物但是还正在处于研究中。维生素 K 是谷氨酸残基翻译后羧化的辅助因子。由于缺乏维生素 k 而导致降钙素 3 谷氨酸残基不完全羧化会增加发生骨质疏松的危险性。因此补充足够的维生素 K 可以促进骨形成以及降低骨折风险。钙剂、维生素 D 及其类似物是治疗骨质疏松的基础用药，可以促进钙离子的吸收和沉积。抗骨质疏松骨折药物的短期疗效是不容置疑的，但是还没有足够的证据以科学指导抗骨质疏松药物的选择，同时缺乏对于抗骨质疏松骨折药物长期疗效的研究。在临床治疗中，钙剂及维生素 D 仍作为基础用药用来预防和治疗骨质疏松骨折，根据患者年龄、性别、发病原因及严重程度等选择二磷酸盐、雌激素、降钙素、PTH、锶盐等药物来治疗。随着技术的发展及临床试验的进一步研究，最终会有一种安全、有效的策略来指导骨质疏松骨折的治疗。