

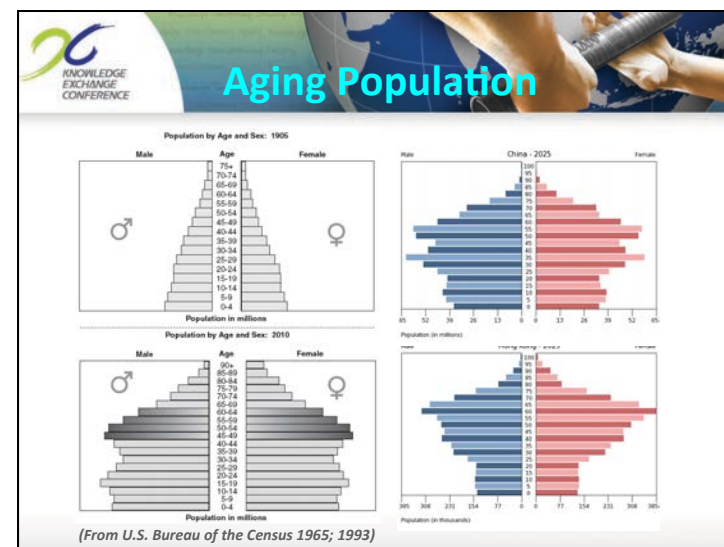
KNOWLEDGE EXCHANGE CONFERENCE

## Interactive Engagement with the Community: From Public Education to Academic Research

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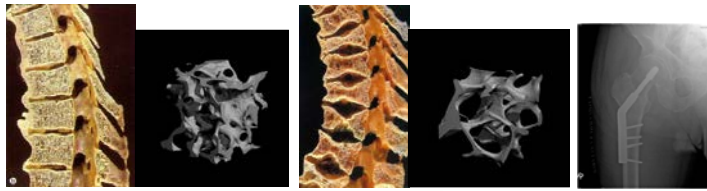




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## Fragility Fracture

- In Hong Kong,
  - Forth cause of bed occupancy; 1% of the total annual hospital budget
  - Hip fracture increased by 300% from 1960s to 1990s
  - Prevalence of vertebral fracture at ~30% in women and 17% in men between 70-79 years of age



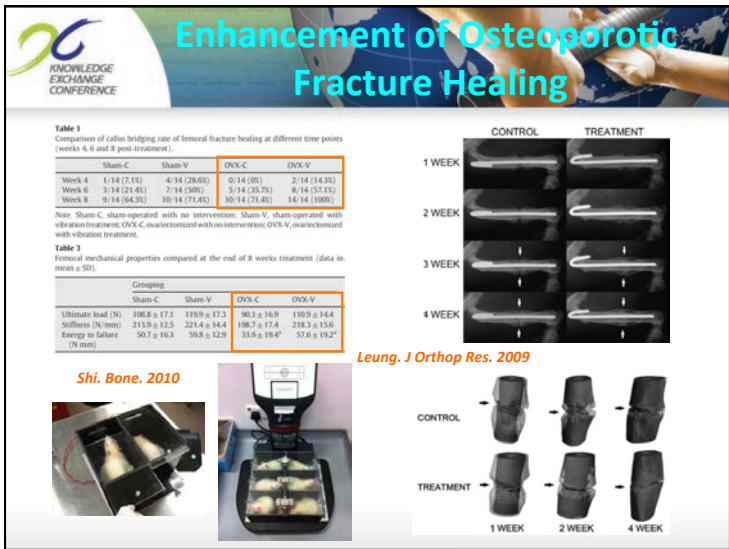
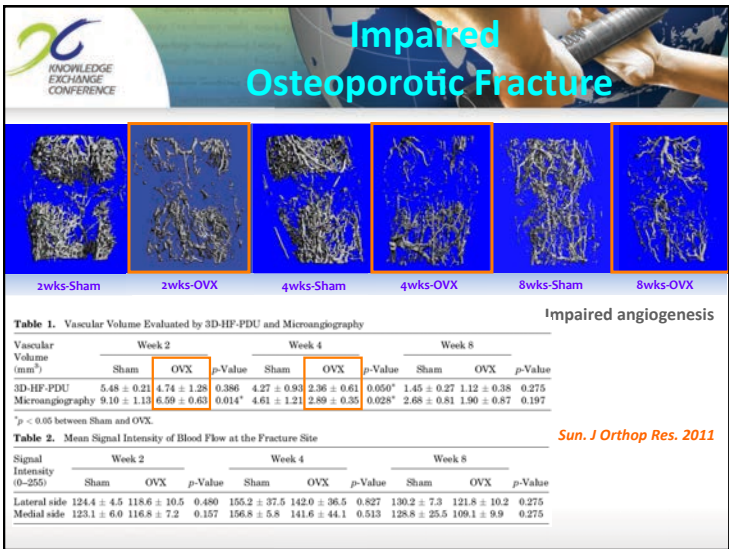
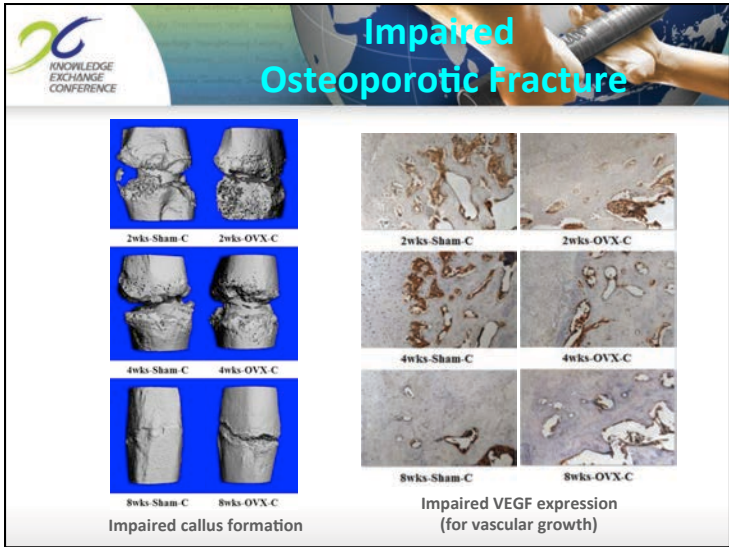
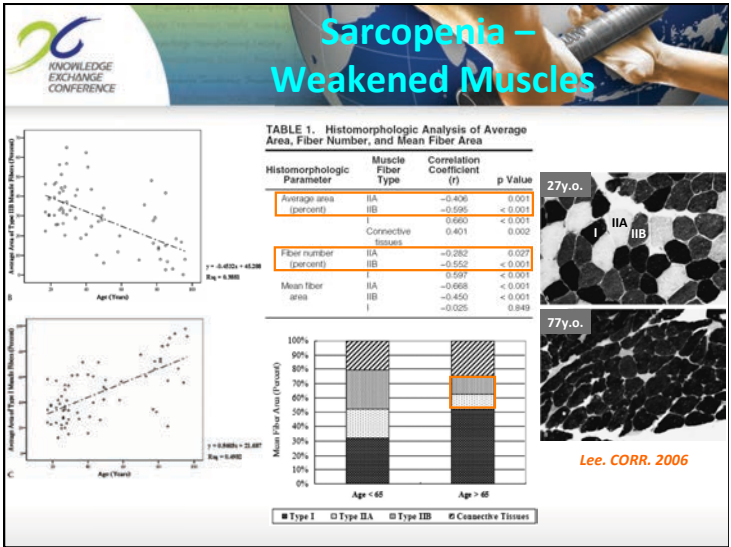
Normal      Osteoporosis

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## Research Team

- Tissue Regeneration Research Team
- Bench experiments started in 1996
- Research focus:
  - Osteoporotic fracture healing
  - Enhancement of fracture healing
  - Biophysical intervention of tissue regeneration
  - Biological responses to mechanical stimulation

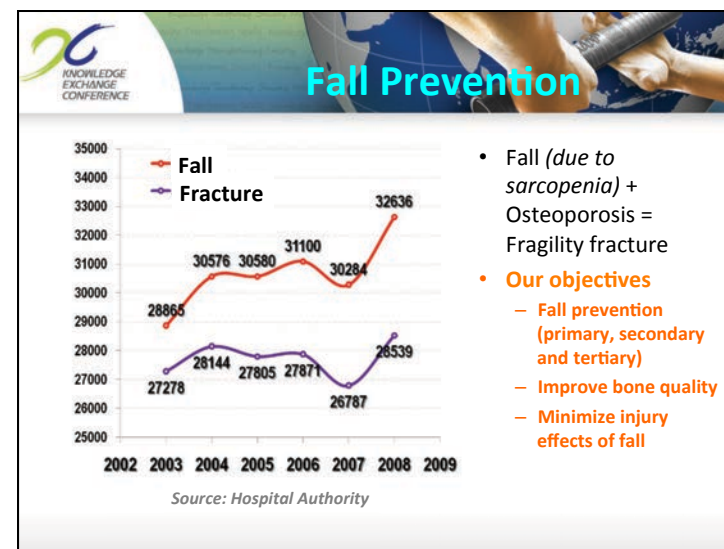






## Public Education

Since 2001 ...

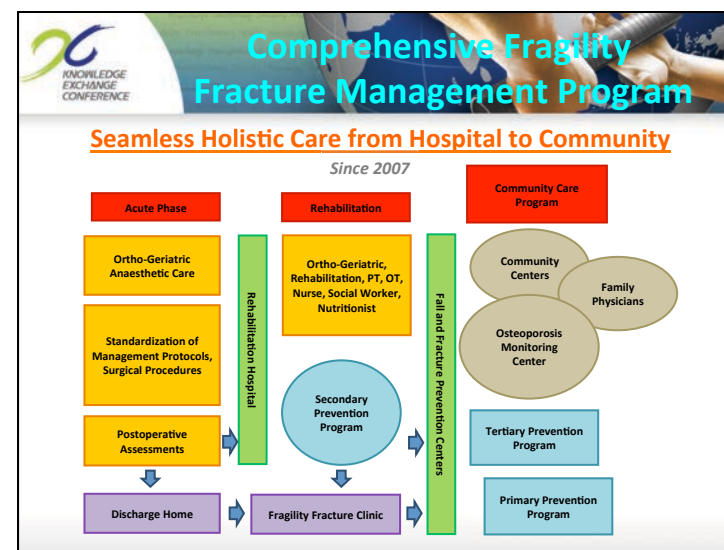
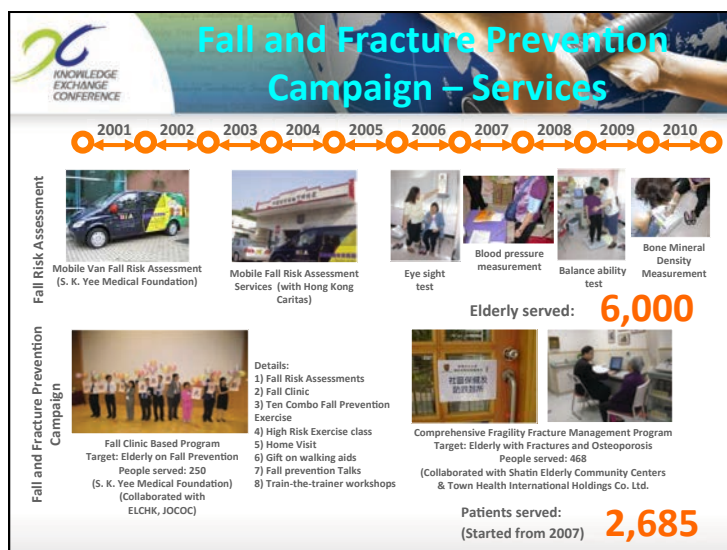



## Fall Prevention Team

- Established since 2001
- [www.no-fall.hk](http://www.no-fall.hk)
  - Information
  - Pamphlet download
  - Educational talk schedule
  - Training workshop





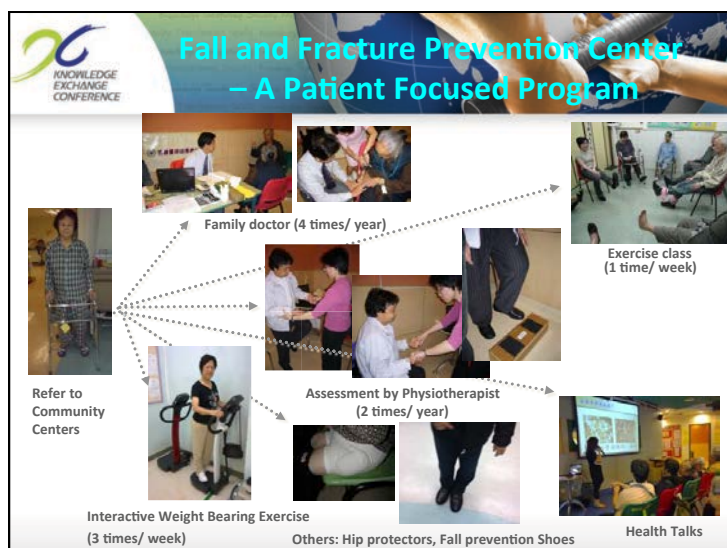



### Fragility Fracture Clinic – A Patient Focused Program

- **Assessments**
  - Surgical and Medical
    - Fracture healing
    - Physical abilities
  - Physiotherapist and Occupational Therapist
    - Continuation of rehabilitation program
- **Preparation for Community Program**
  - BMD measurement
  - Family and care taker
- **Secondary Prevention**
  - Training program
  - DXA measurement
  - Anti-resorptive drugs

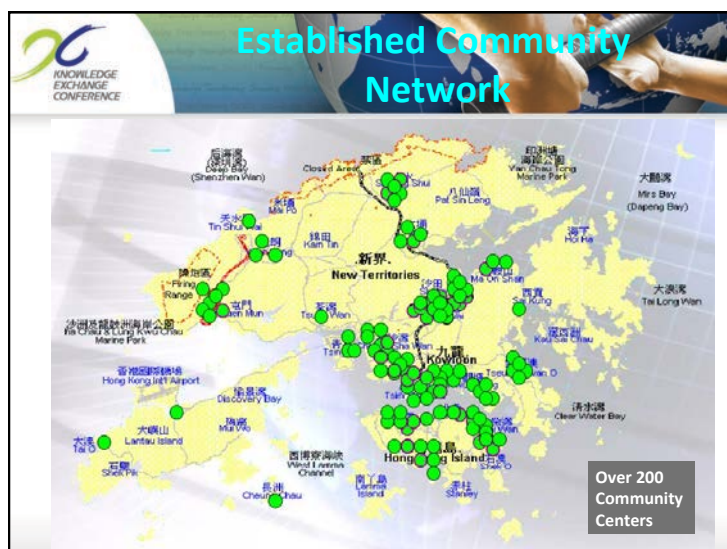
### Fall and Fracture Prevention Center – A Patient Focused Program

- **One-Stop Service at the Door Step**
  - Medical care
  - Rehabilitation
  - Fall and fracture prevention
  - Psycho-social support
- **Support from Specialists**
  - Orthopaedic support
  - Geriatric support
  - Rehabilitation support



### Comprehensive Fragility Fracture Management Program

- Fall Prevention Clinic: 4**
  - Lik Yuen Estate (ELCHK)
  - Sha Kok Estate (TWGH)
  - Kam Tai Court (ELCHK)
  - JOCOC
- Fall Prevention Centre: 7**
  - Average attendance: 70.3%
  - Average compliance of iWE: 64.3%
  - Drop-out rate: 7%




### Academic Research

*Clinical trials since 2005 ...*

### Clinical Trial (I) – Randomized Controlled Trial (RCT)


- Prospective RCT** (Supported by General Research Fund #469508)
  - 710 Postmenopausal women
  - 21 community centers
  - Vibration treatment effect
  - ClinicalTrials.gov ID: NCT00973167



	Fall	No Fall	RR	95% CI
Treatment	33 (18.8%)	143 (81.2%)	RR = 0.68*	0.47-0.9
Control	65 (27.5%)	171 (72.5%)		

	Fracture	No Fracture	RR	95% CI
Treatment	4 (2.30%)	172 (97.7%)	RR = 0.89	0.26-3.12
Control	6 (2.50%)	230 (97.5%)		



### Clinical Trial (I) – Randomized Controlled Trial (RCT)

The reaction time in limit of stability test (second $\pm$ SD)				
	Baseline	9-month	18-month	
Treatment	1.14 $\pm$ 0.42	0.75 $\pm$ 0.22	0.75 $\pm$ 0.17	P<0.005*
Control	0.97 $\pm$ 0.32	0.98 $\pm$ 0.18	0.93 $\pm$ 0.22	




The movement velocity in limit of stability test (degree per sec $\pm$ SD)				
	Baseline	9-month	18-month	
Treatment	2.28 $\pm$ 0.65	3.17 $\pm$ 1.13	3.61 $\pm$ 2.10	P=0.001*
Control	2.86 $\pm$ 1.11	3.24 $\pm$ 3.01	3.13 $\pm$ 1.07	

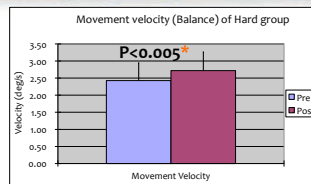
The dominant leg muscle strength (kg $\pm$ SD)				
	Baseline	9-month	18-month	
Treatment	7.30 $\pm$ 2.7	8.88 $\pm$ 2.5	9.23 $\pm$ 2.4	P<0.005*
Control	7.76 $\pm$ 2.8	7.79 $\pm$ 2.8	7.73 $\pm$ 2.3	

### Clinical Trial (II) – Cohort Study

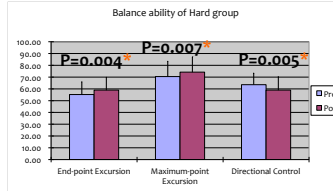
- Compare shoes of different hardness (soft, standard, hard)
- 150 elderly (age=75 $\pm$ 6.5)
- Muscle strength, balancing ability

**Movement velocity (Balance) of Hard group**



**Balance ability of Hard group**



(Supported by ITF #ITS/068/08)

### Clinical Trial (III) – Cost-Effectiveness Study

- To evaluate cost-effectiveness of our fragility fracture program (supported by Public Policy Research Grant #4013-PPR-09)
- 300 post-fracture community elderly (65-80 years)
- From New Territories East and Kowloon Central
- Multidisciplinary management program vs. Conventional care
- Multidisciplinary program: clinical consultation, exercise class, vibration treatment, assessments
- ClinicalTrials.gov ID: NCT01382875

Balancing ability before and after joining Fragility Fracture Program			
	Before joining program	After joining program	P-value
Time up and go (in sec)	22.47 $\pm$ 20.04	20.15 $\pm$ 17.29	0.002
Elderly mobility score	15.99 $\pm$ 4.53	16.73 $\pm$ 4.23	0.001
Berg balance scale	42.99 $\pm$ 12.19	45.78 $\pm$ 10.29	<0.001
Fall risk screening	6.95 $\pm$ 3.04	5.93 $\pm$ 2.92	<0.001



## Product Commercialization



**Interactive Weight-bearing Exercise (iWE™) 互動負重運動**  
V-Health

**Anti-Fall Shoes 安步行™**  
Shoe & Ankor Pedorthic Technology

**Air-bag hip protector (Coming...)**

## Product Commercialization



**2005**: Elderly & Postmenopausal Women (100)

**2006**: Interactive weight bearing exercise platform developed by CUHK

**2007**: Patients with hip fracture (40)

**2008**: Community Elderly (350)

**2009**: Product: iWE platform

**2010**: Product: iWE platform

**Vibration Treatment**

**Fall Prevention Shoes**

**Hip Protector**

**Foot Anthropometry study (500)**

**Shoe last**

**Prototype**

**Fitting Trial (500)**

**Airbag Hip Protector**

## Product Commercialization




**日攝20分鐘 可治骨質疏鬆**

**中大開發研製防跌鞋**


## Discussion

- **Team Running Model**
  - Bench – Public Education – Academic Research – Product Commercialization
  - Translational research and product commercialization
- **Advantages**
  - Win-Win situation between academic and community
  - Provide services and knowledge transfer to community
  - Basic science-clinical trial-product cycle
  - Job satisfaction
  - Partially self-sustain team research



## Discussion

- **Difficulties**
  - Require many funding support from various sources
  - Need good cooperation, close communication and idea sharing between clinicians and scientists
  - Need various expertise and manpower to establish, e.g. clinicians, physiotherapists, occupational therapists, orthotists, nurses, NGO staff, research staff, social workers, etc
  - Lack of space
  - Involve many negotiations
  - Benefit nearby districts mainly, such as Shatin, Ma On Shan, Tai Wai, due to resource limitation



## Conclusion

- Multi-disciplinary approaches and collaborations – Win-win situation
- Provide good services and increase awareness of fall prevention and bone quality maintenance in community
- Generate good literatures for academic
- Good experience
- **No fall, No fracture**



## Acknowledgments




## Acknowledgments

- **Funding / Collaborating Organizations**
  - General Research Fund (GRF)
  - Public Policy Research Grant (PPR)
  - SK Yee Medical Foundation (SK Yee)
  - Health Care and Promotion Fund (HCPF)
  - Knowledge Transfer Office (KTO) Seed Fund
  - Board of Management of the Chinese Permanent Cemeteries (BMCP)
  - Pedorthic Technology Ltd ([www.ezped.com](http://www.ezped.com))
  - V-Health Ltd ([www.v-health.com.hk](http://www.v-health.com.hk))





**Thank You**

上工治未病  
中工治欲病  
下工治已病

Preventing a disease is superior  
Managing an impending disease is mediocre  
Treating a disease is inferior

