

# HKU finds overweight and obesity significantly increase the risk of spinal disc degeneration and low back pain in adults



**Professor Kenneth CHEUNG Man-chee**  
**Dr. Dino Samartzis**

Department of Orthopaedics and Traumatology  
The University of Hong Kong Li Ka Shing Faculty of Medicine

Guest speaker: **Dr. Robin Mellecker**  
Institute of Human Performance, The University of Hong Kong

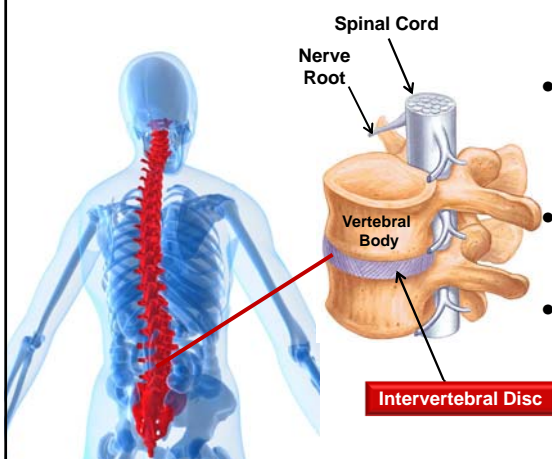
26<sup>th</sup> February, 2012



Department of Orthopaedics and Traumatology, The University of Hong Kong  
香港大學矯形及創傷外科學系



## Intervertebral Disc

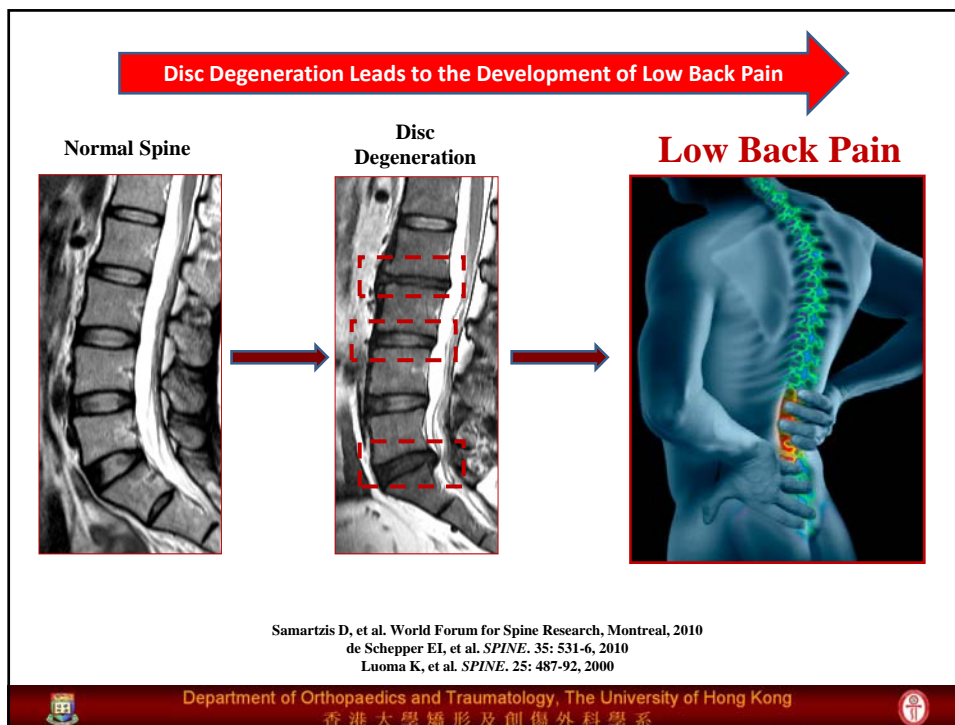


- Provides structure and function of the spinal column
- Cushion and shock absorber
- Indirectly protects neural elements



Department of Orthopaedics and Traumatology, The University of Hong Kong  
香港大學矯形及創傷外科學系





## Low Back Pain

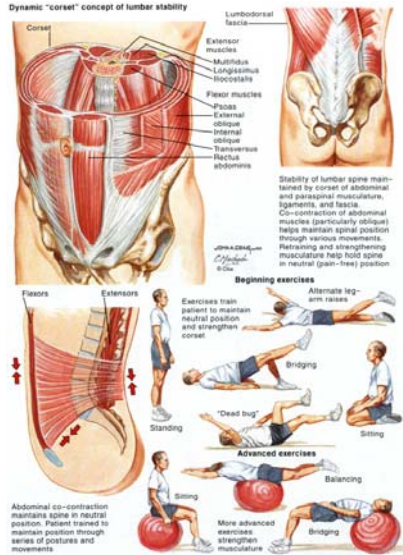
### Global Burden of Disease

- 2<sup>nd</sup> most common condition seeking clinical consult
- Decreases daily function & productivity
- Diminishes the quality of life
- Lost wages
- Increases health-care costs
- Psychological distress
- Low back surgery is the most common surgery

Shen F, Samartzis, D, Andersson GBJ. *J Am Acad Orthop Surg*. 14: 477-87, 2006  
 Wong WS and Fielding R. *J Pain*. 12:236-245, 2011

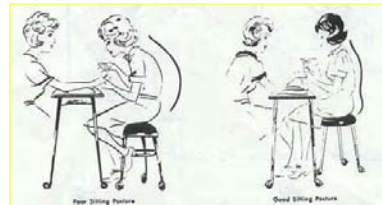
Department of Orthopaedics and Traumatology, The University of Hong Kong  
 香港大學矯形及創傷外科學系

# Low Back Pain - Rehabilitation



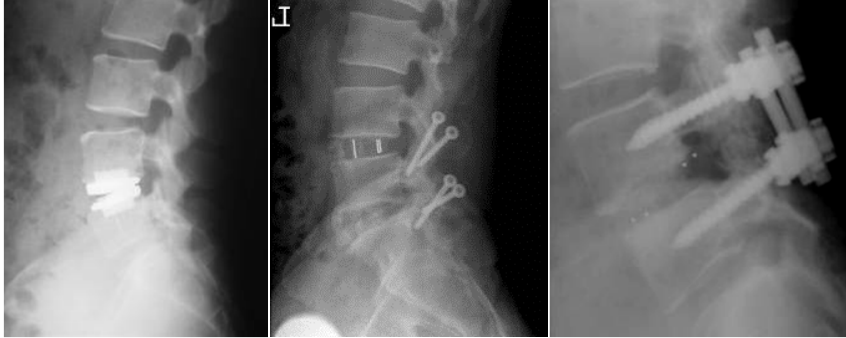
- Physiotherapy
  - Strength
  - Endurance
  - Physical fitness
- Occupational therapy
  - Work safety
  - Work related training

Department of Orthopaedics and Traumatology, The University of Hong Kong  
香港大學矯形及創傷外科學系



Department of Orthopaedics and Traumatology,  
香港大學矯形及創傷外科學系

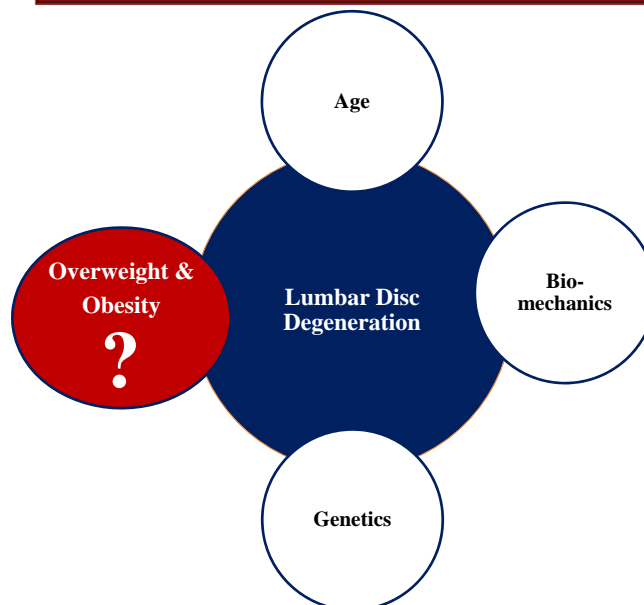
## Current treatment for severe back pain from disc degeneration



Department of Orthopaedics and Traumatology, The University of Hong Kong  
香港大學矯形及創傷外科學系



### Major Causes of Lumbar Disc Degeneration



Department of Orthopaedics and Traumatology, The University of Hong Kong  
香港大學矯形及創傷外科學系



## Hong Kong Degenerative Disc Disease Cohort Study

- Population-based study (since 2001)
- Currently 3,500 Southern Chinese subjects
- Largest cohort in the world assessed with MRI



Department of Orthopaedics and Traumatology, The University of Hong Kong  
香港大學矯形及創傷外科學系

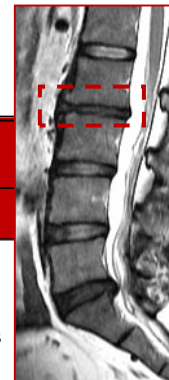


## Assessment of Disc Degeneration (DDD Score)

Radiographic Criteria for Disc Degeneration	
Grade	Description
0 (Normal)	Normal disc height
1	Mild disc height loss
2	Moderate disc height loss
3	Hypointense nucleus pulposus with disc space narrowing

**5 lumbar discs scored for disc degeneration  
and “summed” for DDD Score  
(potential score range: 0 to 15)**

**End-Stage**



Schneiderman G et al. *Spine* 1987;12:276-81



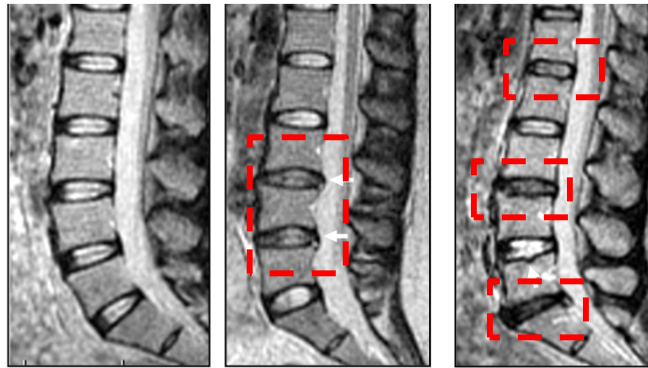
Department of Orthopaedics and Traumatology, The University of Hong Kong  
香港大學矯形及創傷外科學系



## Assessment of Disc Degeneration on MRI

Category	Normal	Mild-Medium	Moderate-Severe
DDD Score Range	≤ 1	1 to 4	>5

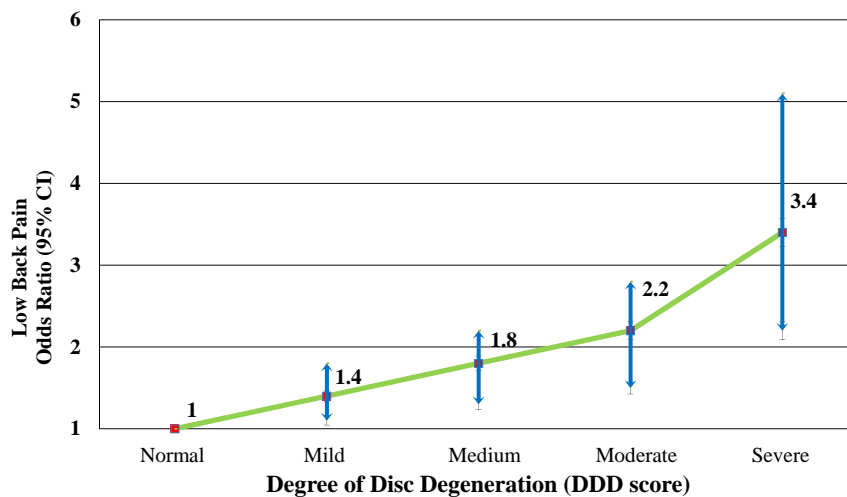
### Examples of Degenerative Disc Disease (DDD) Score



Actual Sum DDD Score	0 (Normal)	2 (Mild-Medium)	6 (Moderate-Severe)
----------------------	------------	-----------------	---------------------



Department of Orthopaedics and Traumatology, The University of Hong Kong  
香港大學矯形及創傷外科學系

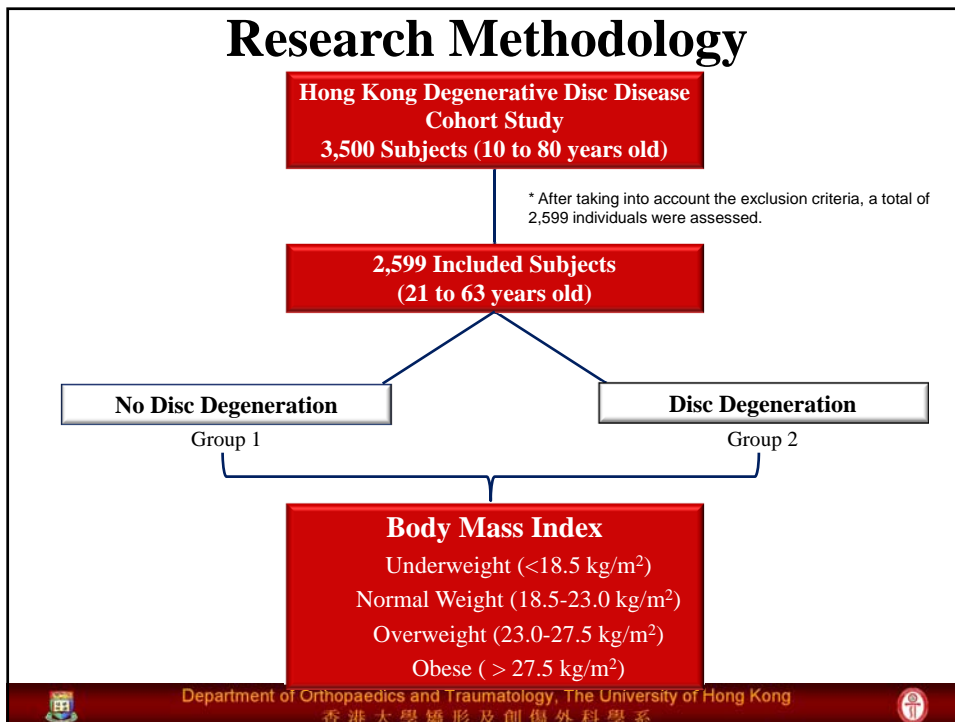
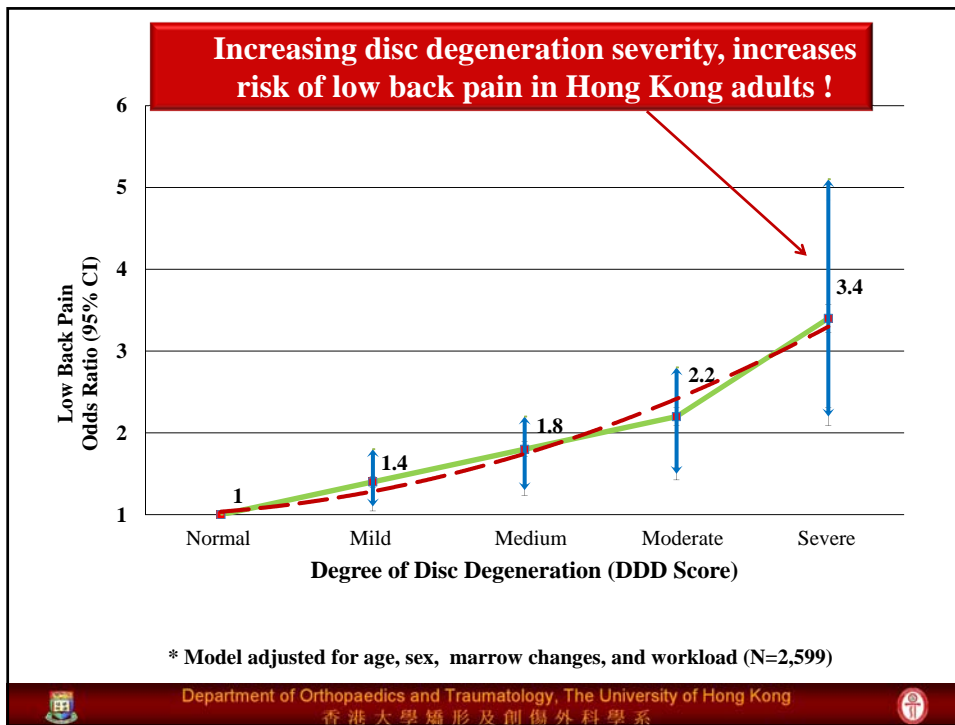


\* Model adjusted for age, sex, marrow changes, and workload (N=2,599)



Department of Orthopaedics and Traumatology, The University of Hong Kong  
香港大學矯形及創傷外科學系





# Body Mass Index (BMI)

**BMI = Weight (kg) / height (m<sup>2</sup>)**



## Examples

**Male**  
**30 years old**  
**1.70 meters**

50 kg – Underweight  
60 kg – Normal  
70 kg – Overweight  
80 kg – Obesity

## Examples

**Female**  
**30 years old**  
**1.60 meters**

45 kg – Underweight  
50 kg – Normal  
65 kg – Overweight  
75 kg – Obesity



# Part II





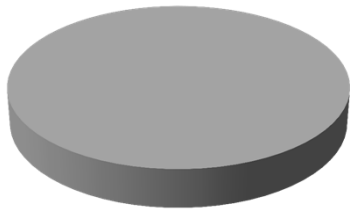
# HKU research findings



Department of Orthopaedics and Traumatology, The University of Hong Kong  
香港大學矯形及創傷外科學系



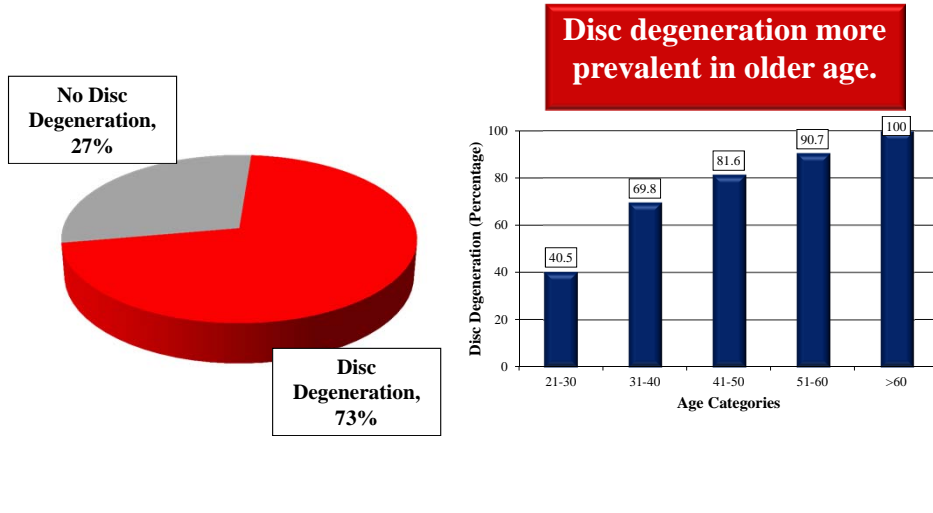
## Prevalence of Disc Degeneration



Department of Orthopaedics and Traumatology, The University of Hong Kong  
香港大學矯形及創傷外科學系



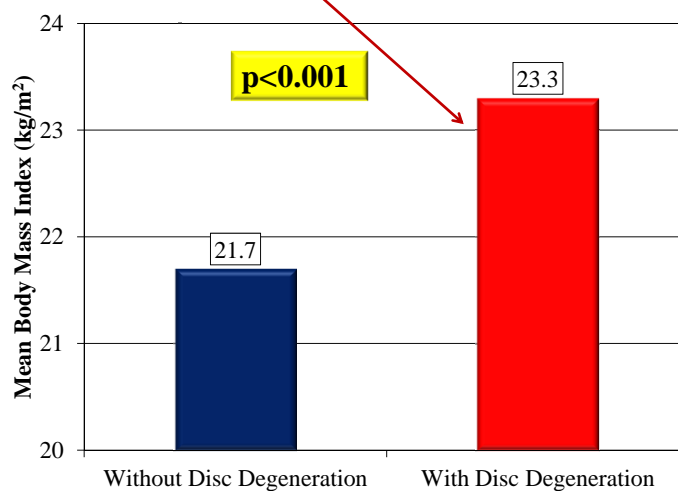
# Prevalence of Disc Degeneration



\* Results are based on MRI of participants

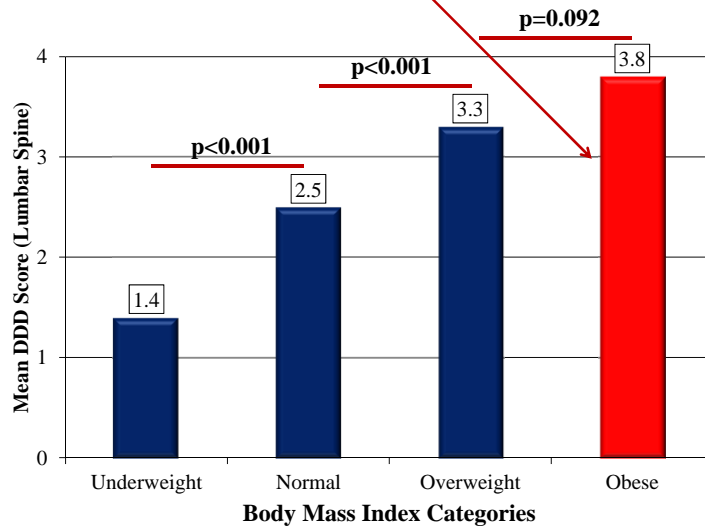
Department of Orthopaedics and Traumatology, The University of Hong Kong  
 香港大學矯形及創傷外科學系

**Significantly higher body mass index with disc degeneration !**



Department of Orthopaedics and Traumatology, The University of Hong Kong  
 香港大學矯形及創傷外科學系

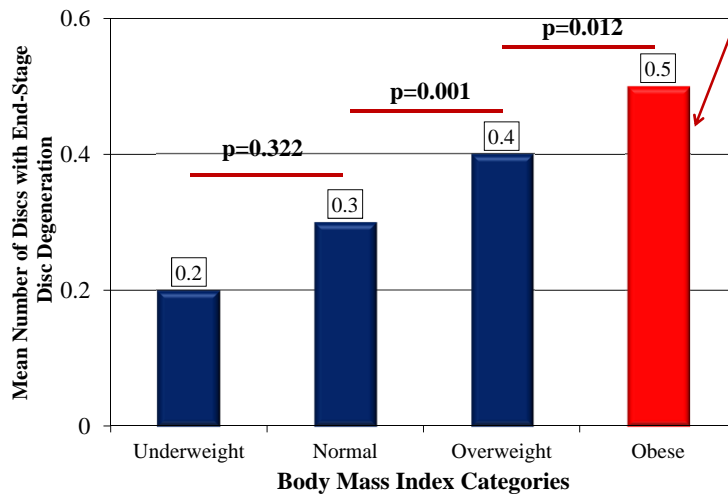
**The heavier, the more severity of disc degeneration !**



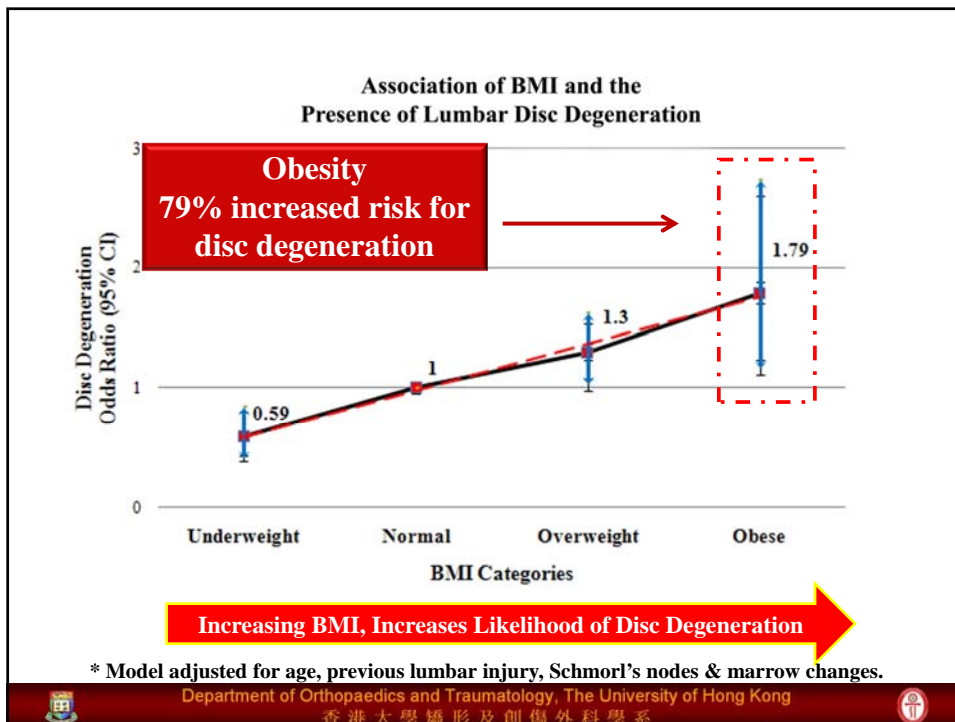
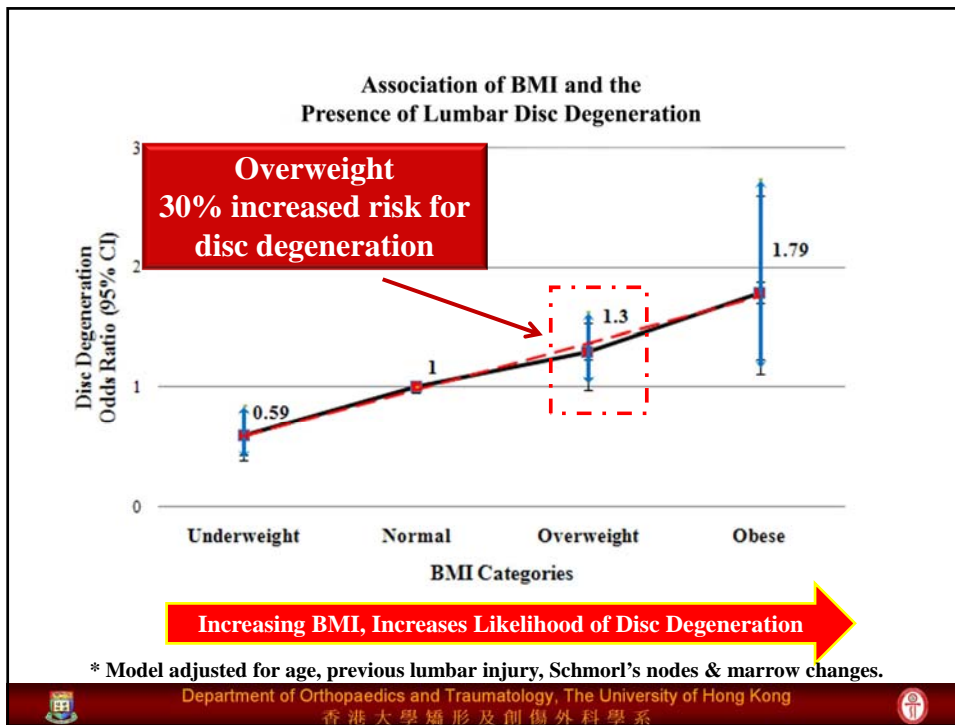
DDD=Degenerative Disc Disease

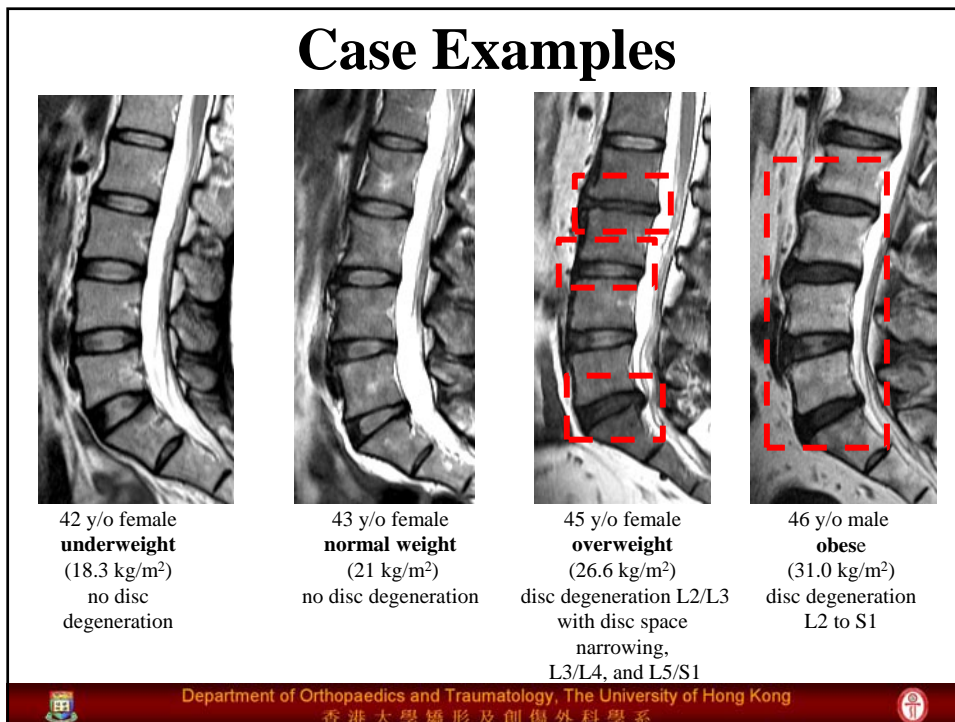
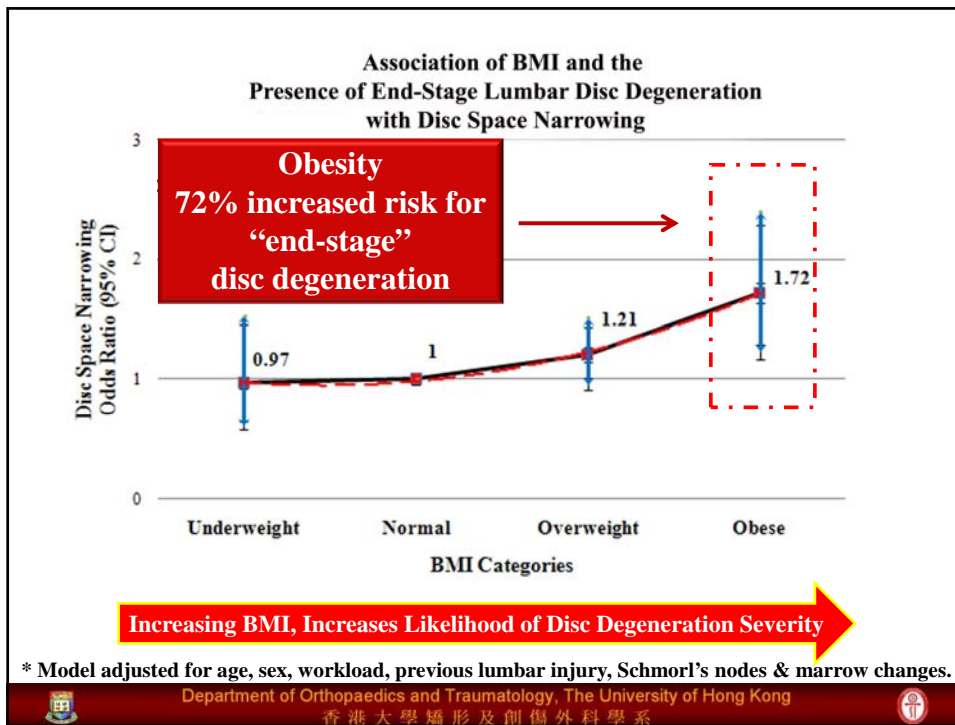
Department of Orthopaedics and Traumatology, The University of Hong Kong  
香港大學矯形及創傷外科學系

**The heavier, the more likely to suffer from “end-stage” disc degeneration !**



Department of Orthopaedics and Traumatology, The University of Hong Kong  
香港大學矯形及創傷外科學系





# Summary of Research Findings

## *Largest study to assess BMI & disc degeneration*

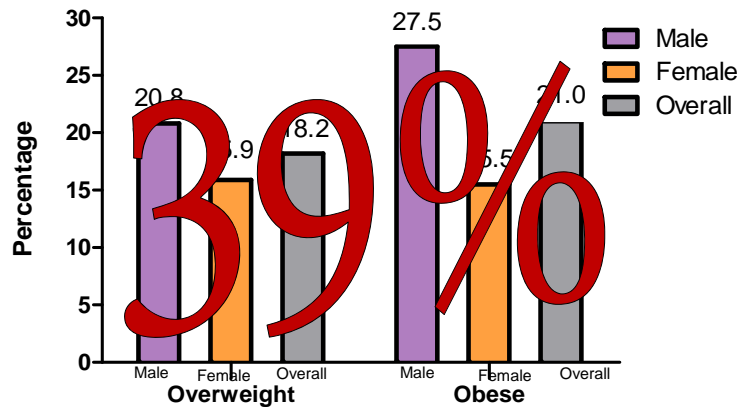
- Overweight/obesity significantly more pronounced with
  - **Presence**
  - **Extent**
  - **Severity**of disc degeneration
- Obesity **DOUBLES** the risk of disc degeneration



# Part III



## Adult Overweight and Obesity in Hong Kong



Information obtained from The Hong Kong Department of Health Behavioral Health Risk Factor Survey for ages 18-64.  
<http://www.chp.gov.hk/en/data/4/10/280/427.html>

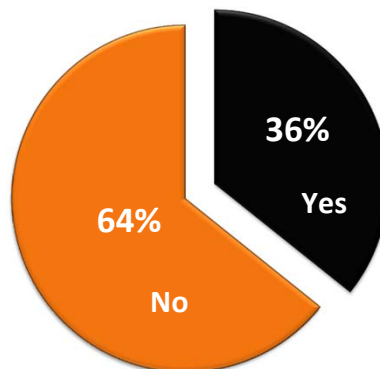


Department of Orthopaedics and Traumatology, The University of Hong Kong  
 香港大學矯形及創傷外科學系



## Physical Activity

Meet World Health Organization Recommendations



Information obtained from WHO [http://www.who.int/dietphysicalactivity/factsheet\\_adults/en/index.html](http://www.who.int/dietphysicalactivity/factsheet_adults/en/index.html)  
 Information obtained from The Hong Kong Department of Health  
<http://www.chp.gov.hk/en/data/4/10/280/427.html>



Department of Orthopaedics and Traumatology, The University of Hong Kong  
 香港大學矯形及創傷外科學系



## Weight Loss & Maintenance

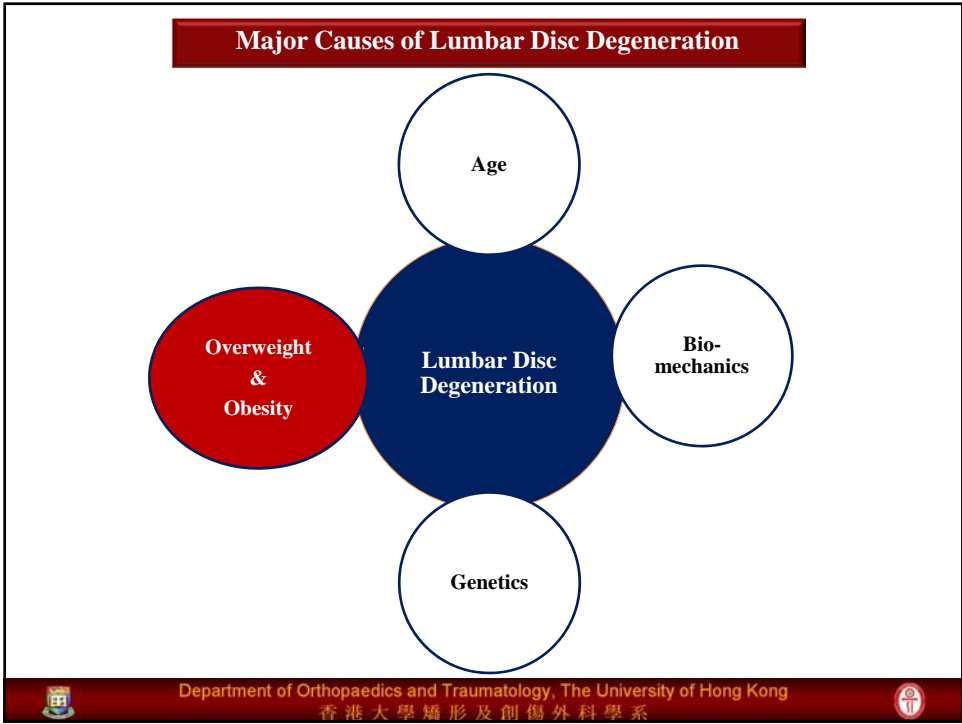
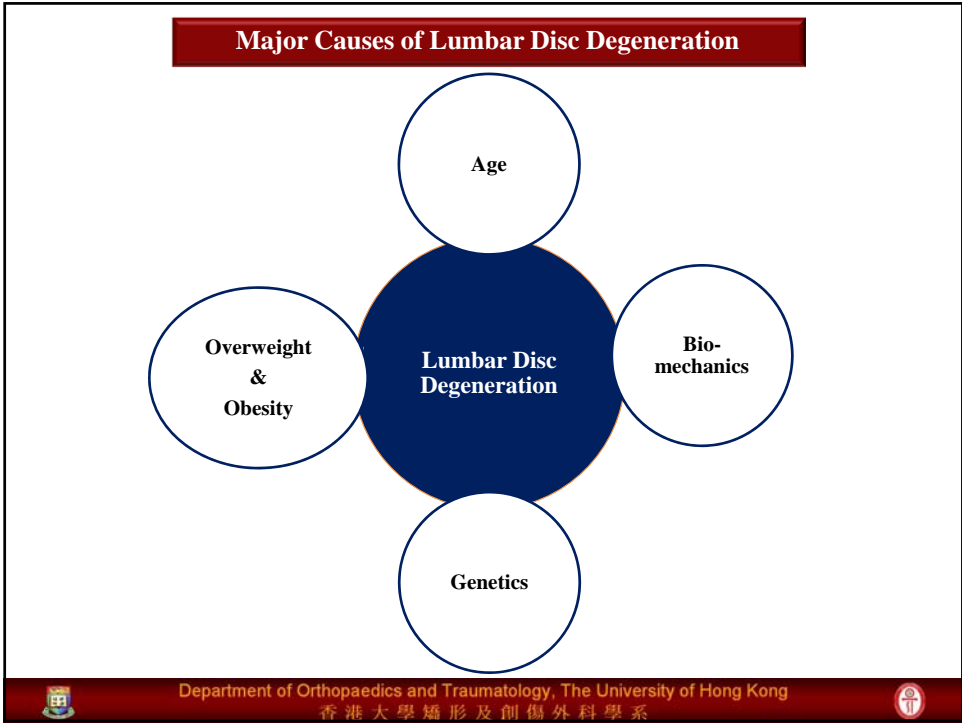
- Start Slow and Simple
  - Combine diet and physical activity
  - Low intensity (walking)
- Successful strategies (NWCR)\*
  - Dietary changes (low-fat, high complex carbohydrate)
  - Daily breakfast
  - Frequently monitor weight
  - Participate in high level of physical activity



## Part IV







## Public Health Concern !

### Obesity and overweight - **negative** health impacts

- Diabetes
- Cardiovascular Disease
- **DISC DEGENERATION & LOW BACK PAIN**

What is bad for the heart,  
is also bad for the back !



Department of Orthopaedics and Traumatology, The University of Hong Kong  
香港大學矯形及創傷外科學系



## Public Health Concern !

### Increase Awareness

- Overweight/obesity in adults
  - Leads to greater severity of disc degeneration
  - Increase risk of low back pain
- Preventive measures
  - Avoid being overweight/obese



Department of Orthopaedics and Traumatology, The University of Hong Kong  
香港大學矯形及創傷外科學系

