The ageing musculoskeletal system

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I heard the old, old men say,
“Everything alters
And one by one we drop away”.
They had hands like claws, and their knees
Were twisted like the old thorn trees
By the waters

W B Yeats
Ageing

- Collagen
- Muscles
- Nerves
- Joints
- Vessels
- Skin
- Fat
Function of MSK

support of the body, provision of motion, and protection of vital organs.

The skeletal system serves as the main storage system for calcium and phosphorus and contains critical components of the hematopoietic system.

Effect our actions
Function of mind

• Sensory Motor
• Memory
• Self preservation
• Cognition
Life
Cost for musculoskeletal conditions

US

- In 1992 was $149 billion.
- In 2004, the estimated was $510 billion, the equivalent of 4.6 percent of the GDP.

http://www.boneandjointburden.org/pdfs/bmus_executive_summary_low.pdf
Aging Muscles

- shrink and lose mass - a sedentary lifestyle can accelerate it.
- number and size of muscle fibres also decrease.
- The water content of tendons, decreases thus stiffer and less able to tolerate stress.
- Handgrip strength decreases,
- The heart muscle becomes less effective.
- Combined with body's low metabolic rate leads to obesity
Decline in skeletal muscle mitochondrial function with aging in humans


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Aging Bones

- mineral content decreases - less dense and more fragile.
- osteoporosis develops – pain and deformity
- cartilage less water content – degenerates
- Ligaments - less elastic, reducing flexibility.
Aging Joints

- Joint motion becomes more restricted and flexibility decreases with age because of changes in tendons and ligaments.
- Cartilage begins to break down joints become inflamed and arthritic.
Presentation

- Pain
- Deformity
- Disfigurement
- Numbness
- Stiffness
- Clumsiness
Osteoarthritis

- Pain Stiff and deformed
- Give away sign
- Activity Modification
- Pain control
- Support
- Surgery
Ageing Hand

age-related degenerative changes in the
• musculoskeletal,
• vascular, and
• nervous systems.
• a combination of local structural changes (joints, muscle, tendon, bone, nerve and receptors, blood supply, skin, and fingernails) and more distant changes in neural control.
• accompanied by underlying pathological conditions (osteoporosis, osteoarthritis, rheumatic arthritis, and Parkinson's disease)

The aging hand.
Carmeli E, Patish H, Coleman R.
Effects of ageing on touch

- loss of sensory acuity can impact on various aspects of function in the elderly, including articulation of speech, hand grip, and postural stability. ..with comorbid conditions such as arthritis and cerebrovascular disease, could explain the wide range of deficit seen among the ageing population.

Numbness

• Nerve compression
  – Carpal Tunnel
  – Cubital Tunnel
  – Radial Tunnel
  – Thoracic outlet syndrome
  – Cervical spondylisis

Arterial insufficiency
Deformity

- OA – nodes, drift
- Clawing
- Cysts
- Ganglion
- Fat loss
Skin

- Blemishes
- Atrophy
- Fragility
- Wrinkles
Collagen

- Degeneration
- Tendinopathies
- Ruptures – mannerfelt
Effects of aging on hand function.

PARTICIPANTS:
• Healthy, independent, young (n = 27, range 20-35 years) and older (n = 28, range 65-79 years) subjects.
• The decrease in the ability to maintain steady submaximal pinch force was more pronounced in women than men.

CONCLUSION:
• Aging has a degenerative effect on hand function, including declines in hand and finger strength and ability to control submaximal pinch force and maintain a steady precision pinch posture, manual speed, and hand sensation.

J Am Geriatr Soc. 2001 Nov;49(11):1478-84, Ranganathan VK, Siemionow V, Sahgal V, Yue GH, Cleveland
Effects of aging on adult hand function.

A study was conducted examining relationships between prehension pattern type and frequency, hand strength, and performance time in functional tasks.

Four groups of 10 adults were selected by age and gender, ranging from 24 to 87 years. Subjects were asked to pour milk into a cup and remove money from a wallet while being videotaped.

Statistically significant differences in age
1. prehension pattern frequency,
2. hand strength,
3. and performance time.

Hand function seemed to remain stable until age 65 years. After age 75 years, age differences in performance were most apparent.

Shiffman LM.
Am J Occup Ther. 1992 Sep;46(9):785-92
The effects of strength training on finger strength and hand dexterity in healthy elderly individuals

strength training-improve finger strength.
improve the hand function of less healthy elderly subjects.

Journal of Applied Physiology October 2008 vol. 105 no. 4 1166-1178
Halla B. Olafsdottir, et al,
Celebrity hands
Search about 141,000 results (0.49 seconds)

"cosmetic hand surgery"
Hand ageing - relevance

- Constantly on display
- Environmental exposure
- Proxy of age (face)
- Hand - face mismatch

Increasing interest
Hand Ageing

3 dimensional process
Loss of subcutaneous volume
Thinning of skin
Prominence of hand veins
Joint thickening
Age spots
The ageing hand

prominent veins

wrinkles

joint thickening

loss of volume

age spots
Literature

Hand rejuvenation: the state of the art

Aesthetic hand surgery
Manske, J Hand Surg (Am) 2002

Rejuvenation of the ageing hand
Butterwick. Dermatol Clin 2005

Hand ageing : patient’s opinions.

The ageing hand. A study to evaluate the chronological ageing process of the hand.
Thank you
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