CS 8803AT Assistive Technology

Aging

April Simmons

February 20, 2017

Outline

- Definition
- Causes
- Physiological Effects
- Personal, Familial & Social Effects
- AT Use & Acceptance

Definition: Stages of Life

	0-2 years: Infancy	
	2-12 years: Childhood	
	13-18 years: Adolescence	
	18-25 years: Young Adulthood	
	25-40 years: Adulthood	
	40-60 years: Middle Age	
60+ Old Age	60-65 Later Adulthood	60-65 Later Adulthood
	65+ Old Age	65-74 Young-old
		75-84 Middle-old
		85+ Old-old

Causes & Effects

Causes

- Being born
- Living past 60, or 65

Why does aging cause changes in the body?

- No definitive theory
- Damage is a popular theory

Aging affects everyone differently

- Genetics, gender, race, lifestyle, attitude

3 Types of AT

Anatomical Changes: Effects

bone loss
- results in: susceptible to fracture and osteoporosis

shrinking with age

joints become less resistant
- vulnerable to injury and to arthritis

decrease in strength, size and endurance of muscle tissue

diminished skin cells
- skin becomes thinner and less elastic
- leads to wrinkles, bruising and tearing easier, longer to heal, more vulnerable to infection, less able to get Vitamin D from the sun

Anatomical Changes: Factors

Genetics

bad habits: smoking, drinking, sedentary lifestyle

intake of calcium and vitamin D

some medications and medical conditions

regular weight-bearing exercise

Posture

sun and sunscreen use

Anatomical Changes: AT

help the elderly stay active

- e.g. more recovery time, location of equipment, alternate exercises
- Samsung WELT

help with painful movement

- e.g. lifting chairs, walk-in showers

help with reduced height

- e.g. re-arranging cupboards

Cardiovascular Changes: Effects

increased stiffness of the chest wall

diminished blood flow through the lungs

reduction in the strength of the heartbeat

- although the body compensates by pumping more blood per beat
- takes longer to recover from stress, shock, surprise, exertion

diminished circulation

- feel colder

artery walls slowly thicken and become less elastic

- more vulnerable to normal wear and tear
- buildup of plaque restricts flow of blood to the heart and brain
- leads to heart attack or stroke- high blood pressure
- greater risk for stroke, heart disease, kidney failure, etc.

less able to regulate body temperature

- more susceptible to hypothermia and heatstroke

Cardiovascular Changes: Factors

diet rich in saturated fat and cholesterol and low in fiber

sedentary lifestyle

elevated total cholesterol levels, esp. LDL

gender

how technologically advanced is the country you live in

Cardiovascular Changes: AT

stroke detection

- Samsung EDSAP (Early Detection Sensor & Algorithm Package)
- BURL concepts

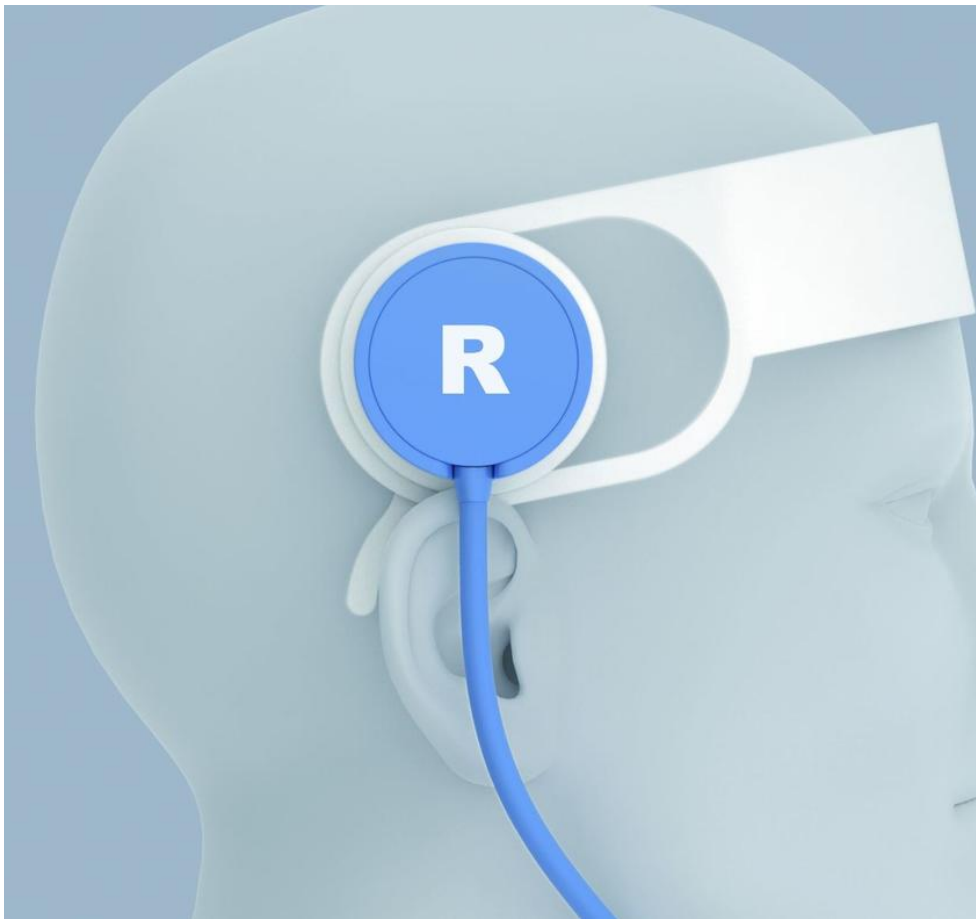
temperature regulation

- e.g. Nest thermostat

regular reminders to drink water

- e.g. high tech water bottles

healthy eating



Gastronomical Changes: Effects

chewing becomes more difficult, chew more slowly, may not chew as efficiently

esophagus doesn't contract as forcefully

- wallowing larger pieces of food
- takes about 50 to 100% longer to make its way to your stomach
- more vulnerable to choking

some don't produce enough or any stomach acid due to gastritis

- faulty vitamin B12 absorption
- anemia, irreversible nervous-system impairment, risk factor for heart disease

prone to gallstones

prone to lactose intolerance

gut/colon becomes sluggish and less toned

- vulnerable to constipation

liver shrinks

- handle certain medications differently
- prone to ulcers

kidneys shrink

Gastronomical Changes: Factors & AT

slowing down and chewing food thoroughly

amount of fat in diet

consuming dairy products with food, or smaller amounts

drinking plenty of fluids

AT: apps for detecting lactose

- e.g. Dairy Free Fast Food

mmunological Changes

decreased immunity by impairing production of antibodies

shrinking thymus gland

increase possibility of confusion in immune system

- body will turn against itself and destroy its own tissues
- autoimmune diseases such as rheumatoid arthritis or lupus

Factors: eating healthy, exercising, good habits

AT: help with moving around, performing ADL's/IADL's/EADL's

- reachers
- orthotics
- replacing small switches and doorknobs
- rearranging the house

Metabolic Changes

muscle mass and body water decreases

basal metabolic rate (BMR) decreases

body fat increases

- greater risk for heart disease, developing certain cancers, and diabetes
- aggravates arthritis

Factors:

- age: begins around age 25
- onset of menopause
- where you store extra fat

Respiratory Changes

lungs become less elastic and chest wall stiffens
- can't cough as forcefully
- diminishes ability to clear germs from lungs
- prone to upper respiratory infections
- Factors: smoking

difficulties swallowing
- increases the chance of aspirating particles of food into lungs
- can cause pneumonia

lung function and capability drop off with time
- major predictor of disease and death
- Factors: regular aerobic exercise, intake of vitamin C

Sensory Changes: Eyesight

weakening eyesight
- decreasing ability to focus on nearby objects

tissues surrounding eyes lose their tone and fat
- droopy upper eyelids and turning outward or inward of the lower lid
- prone to cataracts

pupils get smaller, lenses accumulate yellow substances
- prone to glaucoma which can lead to vision loss and blindness
- Factors: African-Americans, family history

decreased blood flow to the retina
- leads to macular degeneration

AT: glasses, contacts, surgery

Sensory Changes: Hearing Loss

hearing loss at all frequencies

- reduced ability to detect changes in pitch of sounds
- makes your speech less understandable
- Factors: gender

walls of ear canal thin out

eardrum thickens

hair cell loss in the inner ear

- Factors: nerve damage, injury, exposure to loud noise, certain medications

AT: anything that helps with hearing

Sensory Changes: Smell & Taste

lessened sense of smell

- trouble savoring the flavor of food

Factors:

- zinc deficiency
- damage from infections
- some medication

Cognitive changes

memory lapses

information processing slows

trouble multitasking

may lead to:

- mild cognitive impairment (MCI)
- Alzheimer's

Affected by: physical activity, healthy diet, mentally stimulating activities, social interaction, high blood pressure

nteractions with Other Disability

xx

Other Effects

Personal effects

- Ability to perform ADL, IADL, EADL
- Independence & dignity
- Self-concept
- AT: ADL technologies, whole home technologies

Familial effects

- Caregivers, role in the family
- AT: aimed at caregivers, virtual visits

Social effects

- Reduced social opportunities
- AT: increased mobility, virtual visits

AT Use & Adoption

- Knowledge
- Gender
- Race
- Culture
- SES
- Design

Old age is no place for sissies. -- Bette Davis

Age is an issue of mind over matter. If you don't mind, it doesn't matter. -- Mark Twain or Jack Benny

Old age isn't so bad when you consider the alternative. -- Maurice Chevalier

Laughter is timeless. Imagination has no age. And dreams are forever. - Walt Disney

Questions?

References

1. http://www.widener.edu/about/campus_resources/wolfgram_library/documents/life_span_chart_final.pdf
2. http://health.howstuffworks.com/wellness/aging/aging-process/aging.htm
3. http://www.webmd.com/healthy-aging/features/normal-aging-changes-and-symptoms?page=43
4. http://www.mayoclinic.org/healthy-lifestyle/healthy-aging/in-depth/aging/art-20046070?pg=2