ACSM PERSONAL TRAINER EXAM STUDY GUIDE 2014/2015

FITT-VP: Exercise Prescription Framework
F= Frequency, I= Intensity, T= Time, T= Type, V= Volume, and P= progression

CARDIORESPIRATORY FITNESS: Aerobic fitness
3-5 days a week, depending on intensity
Go beyond baseline to lose weight (150 mins +)
Volume → measured by MET (500-1000)

MUSCULAR FITNESS: Muscular strength (1RM) and Muscular Endurance (hold contraction)
2-3 days a week (48 HOURS between using each muscle group)
Intensity: 8-12 reps @ 60%-80%
10-15 reps @ 40-50%
Sets/Volume: Each muscle → 2-4 sets, 2-3 mins between each set
ALWAYS train opposing muscle group as well!
Progression: Many ways → add weight, add sets, add reps, add more training days

FLEXIBILITY: Improve joint range of movement → 10 mins/4 reps each stretch
Hold stretches for 10-30 secs where it is tight

NEUROMOTOR EXERCISE: Great for elderly/ people who are fall risks
Includes balance, coordination, agility, and proprioceptive training
2-3 days a week
Intensity: Changes in 3 ways → Base of support, center of mass, peripheral cues
Tia chi, Yoga, Pilates (walking balance, seated balance, standing balance)

ADVANCED TRAINING: Plyometrics → improve power, agility, speed (jumping training)
Resistance Training → weight training/strength training
Came about during WWII
Should be guided by evidence, not testimony
SAID → Specific Adaptations to Imposed Demands (more reps, more endurance the muscle builds)

PROGRAM DESIGN: Always needs to be changed overtime for progress
Do initial assessments (goals, time frame, health issues, target areas)
Asses → body composition, anthropometric measurements, endurance
Follow up assessment: Keep logs, always customize to the clients physiological needs, ask for feedback → always listen to your client and read their body language

AFFECTS OF OVERTRAINING: Delayed Onset Muscle Soreness (DOMS)
DOMS is not a goal. Soreness should be 3 on scale from 0-10
HYDRATE
*diuretics can influence tissue damage
Rhabdomyolysis → Rapid breakdown of tissue in high amounts

This can be harmful to kidneys and can cause kidney failure (even death)
Symptoms: dark red-brown urine, severe muscle aches, weakness

TRAINING GOALS: Capping → small gains need large amounts of time, yet they are very necessary and shouldn't discourage a client
Most training goals are unrealistic

VARIABLE RESISTANCE DEVICES: Need lever arm, pulley, or cam machine
Purpose is to alter resistance throughout ROM

ELASTIC BAND: For resistance training → matches ascending curve- bell ROM
Doesn't offer feedback to clients/ needs the correct stretch and angle for it to work

DYMANIC CONSTANT EXTERNAL RESISTANCE DEVICES: Good for real world setting
This type does <u>not</u> stimulate neuromuscular systems involved maximally through the entire ROM
It provides little to NO limitation in ROM
<u>Isotonic</u>: Muscular contraction in which muscle exerts a constant tension
*dumbbells, barbells, kettle bells, weight machine

STATIC RESISTANCE DEVICES: These are static/isometric → a muscular action where no change in the length of the muscle takes place
Normally performed against an immovable object
*Good for joint disorders
**Can also be performed by having a weak muscle group contract against a strong muscle group

OTHER RESISTANCE DEVICES: There are <u>three</u>
<u>Isokinetic:</u> Popular in rehab settings → velocity is controlled and can't be accelerated. You can maintain max resistance through the entire ROM
Uses friction, compressed air, and pneumatics
<u>Pneumatic resistance:</u> Compressed air exercises that <u>can</u> be adjusted during a rep
Unable to address balance and control / but allows both concentric and eccentric movements
<u>Hydraulics:</u> Safe and non-intimidating / *concentric only training
You <u>do</u> need to train the eccentric phase to protect muscle

MACHINE V. FREE WEIGHTS: 1) Machines are constricting
2) Free weights are FULL ROM
3) Machines are good for rehab in pinpointing a muscle → free weights are good for triggering stabilizers and assistance muscles
4) Don't generally need a spotter for machines
5) Machines are less intimidating at first
6) Both offer movements that have no joint deceleration
7) Rotational machines accommodate certain body movement that free weights cant

CHOOSING MUSCLE GROUPS: Biomechanical principles → need to specify exercises by:

- joint around the muscle, joint ROM
- pattern of resistance through ROM (ascending, descending, bell)
- pattern of limb velocity throughout the ROM
- type of muscle contraction (eccentric, concentric)

** Transfer Specificity → that what you are training can carry over to what you've been training to do

CHOICE OF EXERCISE: Primary v. assistance → Prime movers: leg press, bench press
Assisted trains muscles that aid in the movement of prime movers (bicep curl)
Multi-joint v. Single joint → Multi joint is squats, military press, pull downs
Single joint is knee curl, bicep curl
*whole body multi-joint is deadlift, power cleans, etc.
Bilateral v. Unilateral → Unilateral helps balance

ORDER OF EXERCISE: Larger muscle group before smaller ones
Multi-joint before single joint / explosive before basic
Weak areas before strong / intense to least intense
*reps: 6-12

***TIP:** Number of sets is a critical variable in volume equation → vital in progression

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CRF ASSESSMENT: Tests how well you can do certain moves → Used for:
Exercise programming, Progress charting, and prediction of medical conditions
*The test is **contraindicated** for unconditioned beginners, and those with preexisting heart problems

ONE REP MAX: To express muscular strength as a ratio to total body weight
Usually test **bench press** or **leg press**
Formula: max weight lifted (lbs)/ weight of client (lbs)

MUSCULAR ENDURANCE ASSESSMENT: applying a force repeatedly over time
Usually test **push ups** and **curl up**
Push ups → women on knees, men standard (till fail)
Crunches → up to 75 (or until cadence is broken)
Tape for crunches: **8cm** apart for 45 and up, **12 cm** apart for 45 and younger

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BMI (Body Mass Index) : (body weight in kg/height in meters^2)
1kg= 2.2 lbs 1 inch = 2.54 cm, 100 cm= 1 meter

Example: I weigh **130lbs** and am **5'5"**. → Convert 130 into kg = 130/2.2= 59.09
Convert 5'5", which is 65 inches= 65x2.54= 165.1cm → 1.65 m
SO → → **59.09 / 1.65^2 = 21.72**
*NOT the best measurement for fat since it does not differentiate between fat and fat free weight
Anthropometry

WHR (Waist-to-Hip Ratio): BEST measurement for body weight distribution

If MORE weight is near the **trunk**, higher risks for many things!

Men → no more than .95 (waist should be 31.5-40 inches)

Woman → no more than .86 (waist should be 27.5- 35 inches)

Anthropometry

SKINFOLD (Jackson-Pollock): It's an estimate, not always accurate, BUT can show client's progress

Sum of 3 skinfolds: Men→ chest, abdomen, thigh

Woman → triceps, suprailiac, thigh

(Then check chart for measurements %)

Body Composition

BIA (Bioelectrical Impedance): noninvasive and easy to administer

Uses electricity to check volume (muscle has lots of water, fat doesn't)

ONLY VALID if: No eating 4 hrs prior

No exercise 12hrs prior

Pee 30 mins before

No alcohol for 48hrs

Body Composition

PLANES OF THE BODY: Sagittal → Left and Right

Frontal → Anterior and Posterior

Transverse → Superior and Inferior

REFERENCE TO THE BODY:

Ipsilateral v. Contralateral → Same side v. Opposite side

Unilateral v. Bilateral → One side v. Both sides

Valgus v. Varus → Distal segment of a joint that deviates laterally v.

Distal segment of a joint that deviates medially

***TIP: Valgus has an 'l' for 'lateral/ Varus sounds like 'air', the knees have gap < -- >

PLANES (AND MOVEMENT):

Sagittal Plane → **Flexion v. Extention**

Movement on FRONTAL axis (ex. Walking, Squatting, Overhead Press)

Flexion: movement decreasing joint angel anteriorly to sagittal plane

Extension: movement increasing joint angel posteriorly to sagittal plane

#2

Dorsiflexion v. Plantarflexion

Dorsiflexion: Flexing the ankle so the foot moves anteriorly

Plantarflexion: Extending the ankle so the foot moves posteriorly

Frontal Plane → **Abduction v. Adduction**

Movement on SAGITTAL axis (ex. Star Jump, Lateral arm raises, side bending)

Abduction: Movement away from midline on frontal plane

Adduction: Movement toward the midline on frontal plane

#2

Lateral Flexion: R or L movement away from midline (usually for trunk or neck)

*head tilt, body tilt

#3

Elevation v. Depression (shoulder shrugs)

Elevation: Movement of the scapula superiorly on frontal plane

Depression: Movement of the scapula inferiorly on frontal plane

#4

Retraction v. Protraction (shoulders front and back)

Retraction: Movement of the scapula toward the spine

Protraction: Movement of the scapula away from the spine

#5

Upward Rotation v. Downward Rotation

Upward R: Superior and Lateral movement of the inferior angle of the scapula

Downward R: Inferior and Medial movement of the inferior angle of the scapula

#6

Eversion v. Inversion (sickle foot, turned out foot)

Eversion: Abducting the ankle → turn out

Inversion: Adducting the ankle → sickle

#7

Radial deviation v. Ulnar deviation

Radial D: Abduction of the wrist on frontal plane → wrist comes in

Ulnar D: Adduction of the wrist on frontal plane → wrist goes out

#8

Pronation v. Supination (Foot or Ankle)

Pronation: Combined movements of abduction and eversion resulting in the lowering of the medial margin of the foot → Ankle leans IN

Supination: Combined movement of adduction and inversion resulting in the raising of the medial margin of the foot → Ankle leans OUT (me…)

#9

Circumduction: A compound circular movement involving flexion, extension, abduction, adduction, circumscribing a cone shape

Transverse Plane→ **Horizontal Abduction v. Horizontal Adduction**

H. Abduciton: Movement away from midline on transverse plane

H. Adduction: Movement toward the midline on transverse plane

#2

Internal (Medial) Rotation v. External (Lateral) Rotation

Internal R: Rotation on the transverse plane toward the midline of the body

External R: Rotation on the transverse place away from the midline of the body

#3
Rotation: R or L rotation on transverse plane (usually neck or trunk)

Other→ **Opposition**: Diagonal movement of thumb across the palmer surface of the hand to make contact with 5th digit (making the OK sign)

BONES

Long Bones → Legs: Femur and Tibia
Arms: Humerus
Forearm: Ulna and Radius
Short Bones → Carpals and Tarsals (hands and feet)
***TIP: Tarsals are feet because 'T' is for 'toes'

ARTICULAR SYSTEM

Joints: Articulations between bones
Ligaments: Tough, fibrous connective tissue anchoring bone to bone

Most common joints: Synovial Joints
No other joint contains synovial fluid
Proprioceptive Feedback: These joints have a sensation because of sensory fibers
*Feedback is IMPORTANT for preventing injury and regulating human movement

CARTILAGINOUS JOINTS: Primary and Secondary
Primary: Usually temporary to permit bone growth/ fuse (epiphyseal plates)
Secondary: Strong, slightly mobile joints (intervertebral disk/ pubic symphysis

SYNOVIAL JOINTS: 6 types
Plane: gliding and sliding
Hinge: uniaxial movements (elbow extension and flexion)
Ellipsoidal: Biaxial joint (flexion at wrist)
Saddle: Unique joint that permits movements in all planes, including opposition
Ball-and-socket: Multiaxial joints that permit movements in all directions (hip/shoulder)
Pivot Bicondylar: Uniaxial joint that permits rotation- primarily around one axis (knee)

JOINTS: Open pack v. Closed pack
Open: Least joint congruency (knee slightly bent)
Closed: max congruency and tautness (knee is straight)

ROM: Active and Passive movement
Active: Voluntary Passive: Moved by external means
ROM is quantified by using **goniometers** and **inclinometers**

ROM is used for: baseline of prescription and to show progress

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Major Joints: KNOW THESE.

SHOULDER INNJURIES: More common than hip

Humerus, scapula, clavicle

The glenohumeral moves on ALL three planes/ most freely moving in body

Joint Muscles – move shoulder

Gurdle Muscles- stabilize and maintain posture

Pec Major is a prime mover for adduction, horizontal adduction, and internal rotation

Rotator Cuff: Stabilizes shoulder in 4 ways →

1) Passive muscle tension
2) Contraction of muscles causing compression of the articular surface
3) Joint motion that result in secondary tightening of the ligamentous restraints
4) The barrier effect of contracted muscles

EXAMPLE OF HEART RATE CALCULATIONS:

RESTING HEART RATE → Usually given. (# of beats in 1 min)

MAX HEART RATE → 2 ways!

1) 220- AGE -or- 2) 208 – (.7 x AGE)

****HEART RATE RESERVE→** Max HR – Resting HR

FIND LOWER AND UPPER → Uses whatever percentage you want! (80%=.8)

Upper → (HR Reserve x .8) + Resting HR

Lower → (HR Reserve x .4) + Resting HR

TARGET HEART RATE → Take upper and lower and divide them by 2

Target HR → (Upper + Lower)/ 2

EXAMPLE OF ABOVE CALCULATIONS

Age: 26, with Resting HR at 64

MAX → 220- 26 = 194

Reserve → 194 – 64 = 130

Upper → (130 x .8) + 64 = 168

Lower → (130 x .4) + 64 = 116

Target HR → 168+116/2 = 142

CONVERSIONS

LBS to KG → 1lb = 2.2kg

INCHES TO CENTIMETERS→ 1 inch = 2.54 cm
CENTIMETERS TO METERS → 2.54 cm = .0254 m

CALORIES DURING WORKOUT

FIND MET → 1 MET = 3.5 mlkg

EXAMPLES OF MET/CALORIE CALCULATIONS

1) Client runs on treadmill for 45 mins at 7mph
He weighs 150lbs (so, 68.2 kg), and MET level is 11.7

CALORIES PER MINUTE → (MET x 3.5 x weight (kg))/ 200
So, (11.7 x 3.5 x 68.2)/200 = 14 kcal
How many calories for the workout?? = 14kcal x 45 mins = 630 kcal

VOLUME IN EXERCISE → Using MET and time
1) Client walks 3mph (roughly 3.3MET) for 30 mins a day, 5 days a week
3.3 MET x 30 mins = 99 MET
Volume = 99 MET x 5 days a week = 495 MET

IDEAL BODY WEIGHT →

Ex: Mark weighs 220lbs and is 25% body fat . He wants to only have 17% body fat. Find his ideal weight.

First → take his weight in lbs and x by (% body fat/100)
So, 220 x (25/100) = 55
Take that number and minus it from 220 → 220- 55= 165

Now you can begin your Ideal Body Weight calculation
Divide the 165 by [1- (ideal % of body fat/100)]
So, 165/ 1- (17/100) = 165/ .83 = 198.8

He wants to be 198.8 lbs to hit 17% body fat.
How much weight does he need to lose?
Take initial weight – new weight
220- 198.8 = 21.2 lbs

SPECIAL PROGRAMMING FOR PEOPLE

Children → 6-17 years of age (60 mins a day)
Have LOWER anaerobic capacity
Thermoregulatory systems are more prone to heat injuries
Target: Endurance (aerobic), muscular strength, bone strengthening

Elderly → 65+ or medically limited 50-64 age

Problems: Stroke volume and cardiac output declines, anaerobic capacity declines
Water loss, slower reaction time, decrease in muscle fibers and atrophy of type II (fast twitch fibers)
**Endurance is better than power
Basically → help them stay active (delay chronic diseases, enhance cardiorespiratory fitness, prevent limitations) need resistance training as well as balance (static and dynamic)
5 days a week, 30 mins (moderate)
3 days a week, 20 mins (vigorous)

CVD→ THEY NEED CARDIORESPITORY FITNESS
Intense aerobic training
5-7 days a week, 20-60 mins (moderate)
Resistance training → to help with CVD demands, improve muscular fitness

Pregnant→ always be evaluated by a doctor
Need an extra 300kcal a week for metabolic demands
Breastfeed BEFORE working out, stay hydrated
10-15 min bouts helps, nothing TOO intense
Avoid→ supine position (orthostatic hypertension)
Isometric/heavy resistance (NONE)
No overaggressive stretching

Diabetes → Main goal is to control blood glucose levels (less than 126mg)
Want to help them decrease complications, reduce blood pressure, improve cardiorespiratory, muscular strength, reduce body fat
THEY NEED CONSISTANCY! 3-7 days a week
If they are on meds or obese, DAILY exercise is key
50% of MaxHR, 20-60 mins
NOTHING too high impact, DON'T workout late
MAXIMIZE caloric expenditure

Hypertension → the silent killer
Goal: Lower both systolic and diastolic
NEED aerobic activity EVERYDAY if possible
30-60 mins a day, 40-60% of MaxHR
Aerobics is key / Cool downs are a must

TRANSTHEORTEICAL MODEL

Pre-Contemplation: Client really isn't thinking about the benefits or taking action towards fitness
Contemplation: The client sees that changes should be made and considers the negative consequences of their behavior

Preparation: Client has a plan of action and will implement the changes within 30 days (may need help planning)
Action: Client is actively making changes (less than 6 months) (may need help problem-solving)
Maintenance: Client is working on the prevention of relapse

RISK STRATIFICATION

High – CVD, asthma, lung disease, cystic fibrosis, diabetes, renal disease (also, if they show risk factors that suggest there is something wrong – dizziness, pain, shortness of breath after mild exertion, ankle edema, known heart murmur)
Moderate – Hypertension, having two risk factors (smoking, prediabetes, age, family history, obesity, dyslipidemia)
Low- only 1 risk factor (that is not listed on high risk sheet)

Exam for Low – Nothing for doctor or pre-exercise or supervision
Exam for Moderate – vigorous exercise for doctor, nothing for pre-exercise or supervision
Exam for High – need EVERYTHING done → doctor for any exercise, pre-exercise for any exercise, and supervision through it all

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THE SPINE

Spine Curves
Cervical and Lumbar: **Lordosis**
***Tip: Lumbar and Lordosis both have an 'L'
Sacral and Thoracic: **Kyphosis**
Lateral deviation: **Scoliosis**
(7, 12, 5) → # of vertebrates in cervical, thoracic, and lumbar
***TIP: Think of eating times: 7am for breakfast, 12 for lunch, 5pm for dinner

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SITS MUSCLES

Supraspinatus → Abduction of humerus / stabilization
Infraspinatus → extension and lateral rotation of humerus
Teres Minor → "^"
Subscapularis → Adduction and medial rotation of humerus

ADVANCED TRAINING/PROGRAMMING

Resistance training → Heavy & forced negatives, functional isometrics, partial repetitions, variable resistance, forced reps, breakdown sets, combining exercises, discontinuous sets, quality training, and spectrum repetition/contrast loading combinations

Heavy and Forced Negatives → Targets ECC training

Always use precaution when doing ECC (for muscle damage)
For hypertrophy and adv. Strength

EX: Bench press → lower it down slowly then have someone help you get it back up.

Functional Isometrics → To increase dynamic strength
Perform near STICKING POINT (weak point)
Basically the opposite of Forced Negative

EX: Strict press → push bar up, then bend elbows (sticking point) and hold it for a few seconds, then lower a little more and hold

Partial Repetitions → Performed with limited ROM
Can be used for hypertrophy or dynamic sets
Many can first do traditional movements and then incorporate partial

EX: Bench Press → pushing the bar up, lowering it half way, then pushing it back up

Variable Resistance Training → Alternate loading throughout the ROM by using elastic bands and chains

EX: On a bench press, you have chains on your rack. When you push up (CON) the chains weigh it down. On the lowering (ECC), the chains weight is lessened.

Forced Repetitions → Going beyond your capacity (with a spotter)
Can be used at any level, but are most effective in advanced training

Contrast Loading → Different weight after sets with different reps
Used to increase hypertrophy

EX: Have 5 sets. First 2 go heavy with 5 reps, then 2nd 2 go moderate for 10 reps, then 1 low for 20 reps

Breakdown Sets → Made to increase hypertrophy and endurance
Set a number of reps and decrease the weight (Like Kegan)

EX: Start heavy and do 5 reps, then take 10% off and do another 5, then take 10% off again and do 5 more

Combining Exercises → performing 2 to 3 exercises consecutively
Muscular strength may increase, but it's mostly for endurance

EX: Thrusters – a clean off the floor, a squat, and then a push press
ALSO

Supersets → consecutive performance of two exercises either from the same group of muscles or different (Body builders usually do same muscles, athletes usually do separate muscles)
Tri-sets (3 exercises) and **Giant set** (4 or more)

Quality Training → Involves reducing rest intervals within specific loading/volume parameters as training progresses

Discontinuous Sets → Sets that include rests between reps

STARTING A BUSINESS

6 Business Models

1. *Sole Proprietorship* → One owner of the business (just need liscense)
2 set backs: Start up capital and personal liability of incurred debt

2. *Independent Contractor* → Service for a business or individual
Can work at multiple places, set their own hours, paid by session

3. *Partnership* → More than one owning the business
Allows for a bigger money pool, resources, and talents
However, you are liable for one another

4. *Corporation* → Formal business entity subject to laws, regulations, and stockholders. It's completely separate from its owners.
Ownership is more easily transferred than ownership in a partnership or sole proprietorship

5. *S Corporation* → Small chapter corporation (better for small business)
Benefits include: Limited risk and exposure of personal assets
No double taxation of both salary and business income
Freedom for each partner to distribute dividends

6. *Limited Liability Company* → Flexible for small/medium size business
More advantageous than partnerships or S-Corporations
Articles of Organization can be filed with the Office of the Secretary of State
Many Personal Trainers use this
***TIP: When you first start a business, you NEED a Comprehensive Demographic analysis

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BLOOD PRESSURE: Normal blood pressure → 120/80 and LESS
Pre hypertension → between 121/81 and 139/90
High blood pressure/ hypertension → 140/91 and up

Systolic pressure → TOP number (max pressure)
Diastolic pressure → BOTTOM number (rest pressure)

CONCENTRIC AND ECCENTRIC

For Exam:

Running uphill → quads contract CONCENTRICALLY
Hamstrings contract ECCENTRICALLY

Running downhill → OPPOSITE OF ABOVE

***TIP: Think of stretching when thinking of concentric and eccentric movements. If you are bending your knee, you are eccentrically using your quad (like a quad stretch)

CALORIES

In a pound → 3,500

In a macronutrient → Protien: 4 Fat: 9
Carbs: 4 Alcohol: 7 (probably won't need)

Glucose Levels:

Resting: Between 70-100
Pre-diabetes: 100- 125
Diabetes: 126 and above

Cholesterol Levels:

Total: No more than 200 (total serum should not be over 5.2)
Triglycerides: No higher than 150
LDL (bad cholesterol) should be around 100 (no more than 120)
HDL (good cholesterol) should not be lower than 35
*** if HDL is more that 60, it's a POSITIVE factor

BLOOD FLOW IN THE HEART

Atria – Upper chambers
Ventricle – Lower chambers

The **right** side collects the DEoxyginated blood (Atria first, then Ventricle) and then pumps it into the lungs

The **left** side collects the oxygenated blood from the lungs and pumps it into the body (Atria first, then Ventricle)

The tricuspid is located between the Right Atria and Right Ventricle
The bicuspid is located between the Left Atria and Left Ventricle
The blood goes into the lungs through the Pulmonary Arteries

THINGS THAT MAY COME UP ON THE EXAM

1) Heart rate INCREASES LINEARLY in relation to work rate and oxygen uptake during dynamic exercise
2) INTERNAL INTERCOSTALS cause forceful respiration → they are respiratory muscles
3) TRICEPS BRACHII extend the FOREARM
4) Eccentric → may induce delayed muscle soreness BUT may be good for rehabilitation
5) What describes the systemic approach to learning anatomy? → Anatomy learned according to organ systems
6) What is another term for the body orientation known as inferior? → Caudal
7) What is a commonly used term for cranial orientation? → Superior
8) The transverse plane has a → Longitudinal axis
9) The sagittal plane has a → mediolateral axis (perpendicular to it)
10) The frontal plane has a → anteroposterior axis

***TIP: Plantarflexion is 'p'ointing the toes (so it is extension)

11) What movement brings the sole of the foot toward the body's midline? → Inversion
12) The axial skeleton makes up the → longitudinal axis
13) How many bones make up the skull? → 29 bones
14) What is the mandible (on the skull) good for? → locating the coritod pulse
15) What are the best pulse sites? → radial and brachial
16) The outer, fibrocartilaginous portion of intervertebral discs is called? → Annulus fibrosus
17) What does the Annulus fibrosus do? → Binds the vertebrae from the spine together and resists destructive forces
18) What is a primary, normal curve in the sagittal plane? → Sacral
19) What are Secondary curves? → they are curvatures of the spine that develop as an infant progresses in weight bearing.
20) Which are the secondary curves of the spine? → Cervical and lumbar
21) What is hyperlordosis? → An abnormal cuve, exaggerated anteriorly lumbar curvature
22) Which ribs do not articulate to anything? → Ribs 11 and 12
23) How many pairs of ribs are there? → 12 pairs, 7 pairs are articulated, 5 are not articulated
24) What is the importance of the intercostal space between the true ribs? → It locates the correct placement for electrocardiography electrodes
25) What part of the sternum should you place your hands for CPR? → Xiphoid process (lowest part of sternum)
26) What part of the sternum helps you locate paddle placement for defibrillation? → Manubrium (highest point of sternum)
27) What is the inferior angle of the scapula used for? → skin fold test site for fat assessment

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MORE INFO THAT MAY BE ON THE TEST

1. Chest pain and angina – Nitrates and nitroglycerine
Blood pressure problems – Beta blockers and antihypertensives
Lipids and cholesterol (LDL) – Antihyperlipidemics
Blood coagulation – aspirin

2. 90% of fat stored in body connected to glycerol molecule – Triglycerides (TG)
It is three fatty acids connected to glycerol. Cholesterol and phospholipids are also a part of dietary fat.

3. Saturated fatty acids – single bond (worst one)
Monounsaturated fatty acids – one double bond
Polyunsaturated fatty acids—two or more double bonds

4. Hamstrings can contribute to lower back pain. If not stretched through its ROM it can lead to chronic lower back pain

5. Macrominerals – calcium, potassium, magnesium, phosphorus, sulfur, sodium, and chloride. They are MACRO because you need big doses of them

Microminerals are iron, zinc, manganese, copper, etc. that you only need LITTLE amount of at a time

Minerals, in general, are inorganic substances that assist enzymes to help make the body function

6. Negligence – Failure to conform one's conduct in a generally accepted duty

Commission (Or gross negligence) is a conscious act (voluntary)

Ommision – reckless disregard of the legal duty and of the consequence to the plaintiff

* So negligence and gross negligence is more of a conduct based problem

7. If someone has heat exhaustion, you should STOP the workout, get them water and electrolytes and have them laying supine with feet elevated

8. Rotation is movement of long bones about their long axis

9. **Work Rate = force x distance**

If the question asks for Watts, then divide the answer by 6

10. Body Composition = relative proportions of fat and fat-free (lean) tissue

11. Training regularly DOES NOT change your CO (cardiac output). However, it does lower your HR and increases your stroke volume

12. The RPE (Rating of perceived exertion) helps with clients who can't properly regulate their own HR or have medications that alter their HR. On the Borg Scale (6-20) it should be around a 12-16 for intensity.

13. HIGH Risk factors for CVD (cardiovascular disease) are – age (men over 45, women over 55), smoking, family history of myocardial infarction, hypertension (140/90), Diabetes type 1 for more than 15 years, or type 2 in individuals over 30, and MOST IMPORTANT, your total cholesterol should be LESS than 200mg, or HDL must be MORE than 35 mg!

14. Waist-to-Hip ratio: Men should be NO MORE than .95

Women should be NO MORE than .86

WAIST ALONE: Men should be NO MORE than 40 in (should be less than 31 in)

Women should be NO MORE than 35 in (should be less than 27 in)

15. VITAMINS – Water Soluble = Vit B complex and C

Need these for everyday life – metabolism!

FAT soluble vitamins = A, D, E, and K and are stored in body fat

16. If elderly begin to work out, their life satisfaction will go up, but not their appetite.

17.Angina- discomfort associated with myocardial ischemia. It means there is insufficient blood flow to one or more arteries.
Sympotms can be felt in the chest, arm, neck, and shoulder

18. Physiological theories provide conceptual framework for DEVELOPMENT, not management of programs. They evaluate effectiveness, NOT measurement of outcomes. All about MOTIVATION and application of COGNITIVE-BEHAVIORAL principles.

19. PNF (Prioprioceptive neuromuscular facilitation) can cause residual muscle soreness, is time consuming, and usually needs a partner. If your partner pushes you too hard, injury can happen. This type of stretching deals with the contraction and relaxation of agonist and antagonist muscles.
Static stretching is the one most used – hold 10-30s in a slight discomfort position
Ballistic has bouncing involved and can cause muscle soreness or acute injury.

20. Plyometrics → A method of strength and power training that involves an eccentric loading of muscles and tendons followed immediately by an explosive concentric contraction. There is NO significant difference in power improvement when comparing plyometrics with high intensity training. This way might actually CASUE injury (musculoskeletal).

21. The informed consent document is NOT a legal document

22. ACSM recommends that exercise intensity be prescribed within what percentage of oxygen uptake RESERVE should be 40%-59% and 60- 89%

23. ACSM recommends 8-12 reps for strength and endurance training.
Should exercise each muscle group 2-3 nonconsecutive days a week

24. Transtheoretical Model --- uses Self-reevaluation. This model deals with the processes of behavioral change.
Behavioral process – Counterconditioning, helping relationships, reinforcement management, self-liberation, and stimulus control)
Cognitive Processes – consciousness raising, dramatic relief, environmental reevaluation, self- reevaluation, and social liberation)

EXTRAS FROM THE TEST

Need to know…

1. **Risk Stratifications**—Know SPECIFICS for the Coronary Artery Disease (CAD) and Cardiovascular (CVD). There are a few questions where they may use the same client but ask didn't questions regarding this persons medical revue.
2. **Know** HDL carries lipids away from storage and to the liver (*this was on my exam, however yours may ask about LDL or saturated fats)
3. **Know** protein can be turned into fat in the body.
4. **Know** about arm and leg movements when it comes to eccentric and concentric movements (*I had a few questions on this. One had to do with seated leg extension, standing leg abduction, and I think one dealt with an arm curl)
5. **Research** cortisol. It asks a question about it, particularly when it is high.
6. **Calorie intake—**There was a very specific question on a man's carb intake on a 2,500 calorie diet. Be able to make calculations around how much he can eat, has left to eat, how many carbs he can have, fats he can have, etc. My question was specifically about his carb intake.
7. **Know** what the liability form is called **AND** what the Privacy sheet is called. (*I believe its HIPAA)
8. **Know** that supplements are the most frequents claims related to the violation of scope practice.
9. **Know** that HDL is seen as a **positive** in the risk factor scheme if it is above 60.
10. **Know** what can help with colds sometimes (this was one of the odd ones. All I remember is one of the choices being Echinacea, which is what I put)
11. **Models –** The most important one is Transtheoretical, but do brush up on the others! They asked a few different questions concerning those. Know **stimulus control** and **motivational interviewing.**
12. **Transtheoretical Model –** One specific question asked which part of the model was this person in- "I really want to start working out but I just don't have the time."
13. **Water intake** on a hot day.
14. **Intrinsic and Extrinsic –** They asked two very specific questions on this. KNOW the difference when it comes to your clients.
15. **Muscle strength –** In initial weeks, know what causes muscle strength
16. **Tricuspid –** Know what it SPECIFICLLY does (not just where is it located)
17. **Dull Ache –** If a man complains of a dull ache in the left side of his chest after working out, where is that pain coming from?
18. **High Altitude –** Know what you should be doing if you are working out in this climate
19. **PNF –** Know exactly what is means, not that it's just one of the stretching techniques
20. **Smoking—**Know exactly what it could do to the body after smoking prior to exercise. (*see what nicotine does to the body)
21. **Spotting technique—**They asked two questions. Not sure if I got them right, but I'm pretty sure you should never just stand there and do nothing.
22. **Children –** Know if kids should be allowed to start resistance training, **and** know about children in hot weather (more prone to heat injuries)
23. **Pregnant women –** should not be in a supine position. **Also** know what to do if your client tells you they have become pregnant. What do you do? (*I know two of the choices were to continue doing the usual workout until the 2nd trimester, or have them go to a physician right away to get checked)

24. **Resistance Training –** Had two questions regarding specific types of training (*supersets, pyramid, forced negatives, etc.)
25. **Bronchial dilators –** Know what they do.
26. **Hypoglycemia** – If someone is experiencing hypoglycemia after a workout, you call the physician. Once the physician is called, what do you do? (*three of the choices where give them insulin, give them an orange juice, or wait till the physician arrives) (I think answer was give them an orange juice)
27. **Law**—Know what law you are under as a Personal Trainer when someone needs resuscitation methods. Others are under it but you are not. (*one of the answers was the Good Samaritan Law—that's most likely the answer)
28. **Protein** – Know what a 'complete' bond is. (Whether its all the essential amino acids, or just one, etc.)
29. **Absolute and Relative Contraindications** – Know these definitions because they will ask how they differ
30. **Body Fat**—What is the normal percentage for men and women (*keep in mind they could ask you a what the underweight and overweight is as well)

AND THAT'S A WRAP