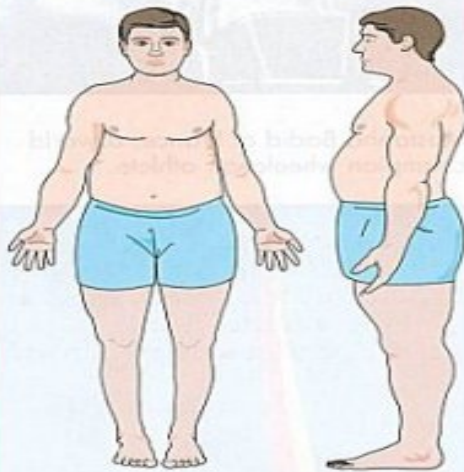


Assessing Health & Functional Fitness

POSTURE AND SOMATOTYPING

SOMATOTYPING

Extreme endomorph



- wide hips and narrow shoulders (pear-shaped)
- a lot of fat on the body
- a lot of fat on the upper arms and thighs
- quite slim wrists and ankles

Somatotype rating: 7 1 1.

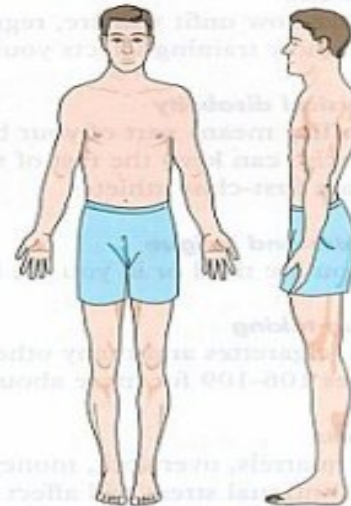
Extreme mesomorph



- broad shoulders and narrow hips (wedge-shaped)
- a large head
- a muscular body
- strong forearms and thighs
- very little body fat

Somatotype rating: 1 7 1.

Extreme ectomorph

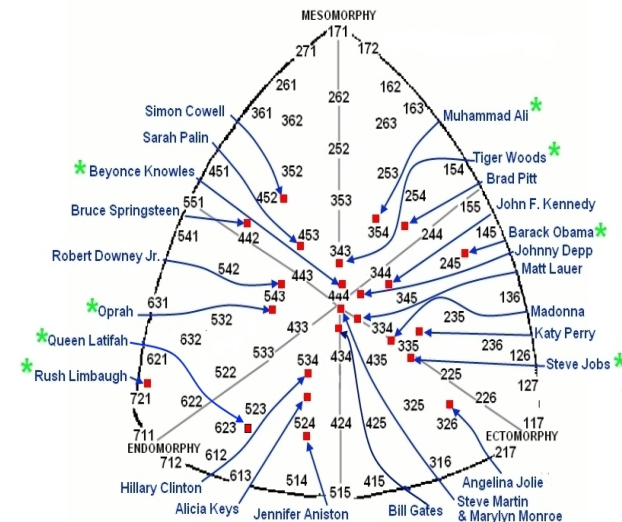


- narrow shoulders and hips
- a thin face and high forehead
- a thin narrow chest and abdomen
- thin legs and arms
- very little muscle or body fat

Somatotype rating: 1 1 7.

SOMATOTYPING (Classification)

- A somatotype number of three digits is determined for an individual classified by the system, with the first digit referring to endomorphy, the second to mesomorphy, and the third to ectomorphy; each digit is on a scale of one to seven. Hence the extreme endomorph has the somatotype 711, the extreme mesomorph 171, and the extreme ectomorph 117. So just to get an idea of how you rank, have a look at the diagram below



* Names with the green asterisk are in a relative position because they can't be shown on this two dimensional chart. For example: Muhammad Ali is not a 3.5,4 but rather a 3½,6,4 and would therefore be on a 2nd tier or level. Rule of thumb: those marked are from ½ to 1 point higher on the highest and/or lowest numbers.

SOMATOTYPING (Benefits)

■ Endomorphs:

- Size benefits sports such as rugby where bulk is useful, provided it can be moved powerfully
- Tend to have large lung capacity which can make them suited to sports such as rowing
- They can increase muscle mass much more easily than ectomorphs
- Sports that require endomorphs would include sumo wrestling, short put, javelin and hammer throw.

■ Mesomorphs:

- Respond well to cardiovascular and resistance training
- Can sustain low body fat levels
- All muscle groups can be used to derive positive training adaptation
- Dependent on the sports' needs they can easily gain or lose weight
- Sports that require mesomorphs would include bodybuilding, weightlifting, sprinting, boxing and rugby.

SOMATOTYPING (Benefits)

■ Ectomorphs:

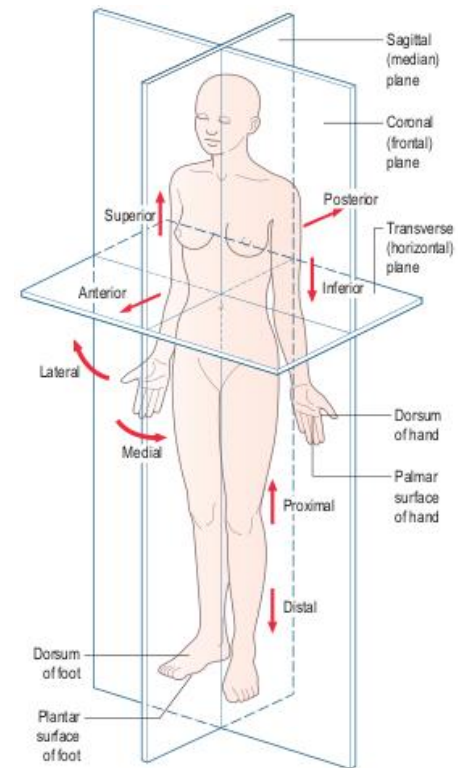
- Light frame makes them suited for aerobic activity like gymnastics
- Smaller body surface area also enhances their suitability for endurance activity
- Their body is better at thermo regulation, important in endurance based sports
- Sports that require ectomorphs would include long distance running, high jump, gymnastics and horse racing (jockey)

ANTHROPOMETRY

- HEIGHT
- WEIGHT
- BODY COMPOSITION

PLANES AND MOVEMENTS

- **Sagittal/ Median**
 - Flexion/ Extension
 - Dorsi/ Plantar Flexion
 - Forward/ Backward Bending
- **Coronal/ Frontal**
 - Abduction/ Adduction
 - Lateral Flexion
 - Ulnar/ Radial Deviation
 - Eversion/ Inversion
 - Pronation/ Supination
- **Transverse**
 - Internal/ External Rotation
 - Axial Rotation



POSTURE

- Muscle & Skeletal balance which protects the supporting structures against injury or progressive abnormal strain
 - Well-being (good habits) ... personal control
 - Key features: Alignment, Joint positions, Muscle Balance
 - Antigravity 'extensor' muscles
 - Breathing efficient, adequate (with reference to thoracic cage & accessory respiratory muscles)
 - Organ positions/function (with reference to abdominal/pelvic control)

TENSILE INTEGRITY

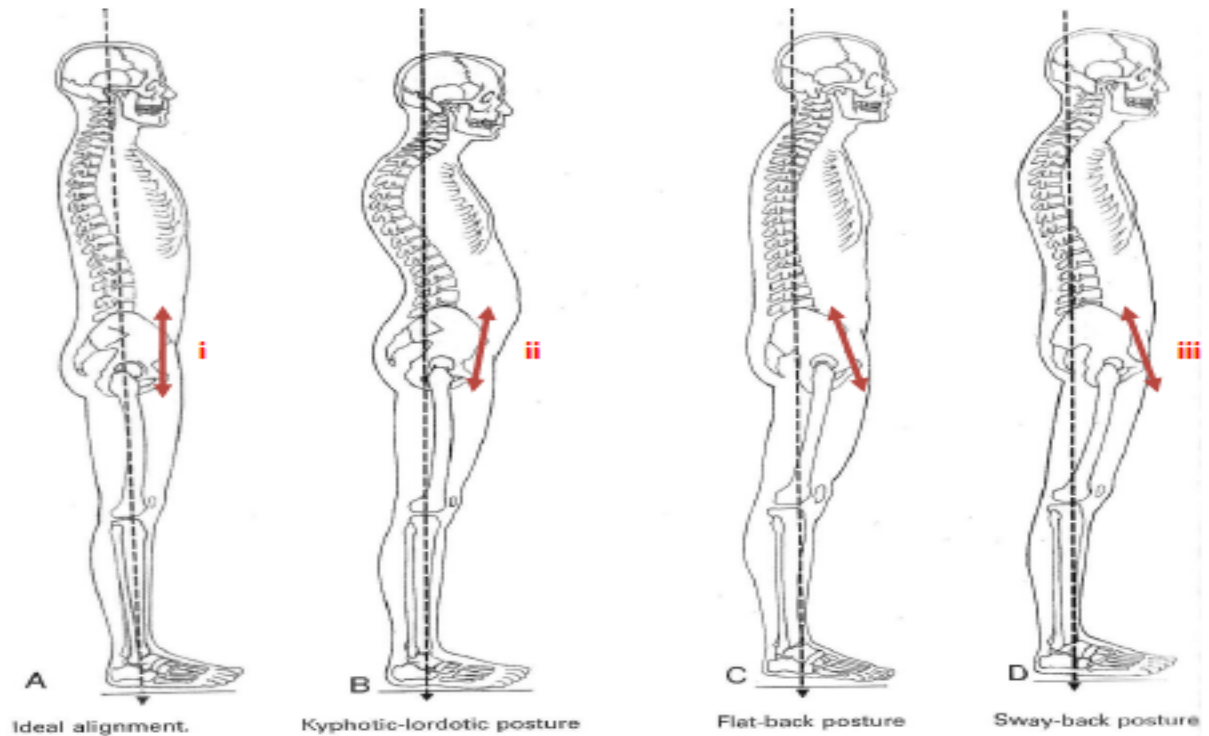
■ Tensegrity

- Bones acting as spacers kept together by soft tissue. The muscles and connective tissues provide continuous tension, while bones accept variable compressive forces.
- 'Extensor' tone against gravity, 'Flexor' tone to allow bones to 'float' as spacers
- The tension-compression interactions of tensegrity minimise material needed, add structural resiliency, and constitute the most efficient possible use of space. Stresses are evenly distributed throughout the entire structure rather than accumulating at certain points.
- Compressive issue (OA), Tensile Issue (instability, Weakness)

FAULTY POSTURE

- Faulty Muscle & Skeletal balance allows increased strain on the supporting structures, with less efficient balance of the body. CAUSES:
 - 1. Cultural aspects. Influencing how people should 'appear' ...
 - 2. Repetitive, specialised tasks.
 - 3. Discomfort, Pain
 - Regional pain syndromes are common place in work, sport, recreation
 - great variety in postural pain – onset, severity, type of symptoms
 - acute &/or widespread symptoms need to be diagnosed/managed first before assessing muscle imbalance & faulty alignment. For example during the acute stage, immobilisation & support can help settle symptoms. Regard for acute/widespread inflammatory responses/conditions
 - 4. Disability – functional; structural e.g. scoliosis, post-surgical mis-alignment, chronic functional pelvic mis-alignment, musculoskeletal conditions (OA, RA, OP ...)
 - 5. Dysfunction, Performance – various systems can impact e.g. cardiovascular; respiratory; autoimmune

COMMON POSTURAL TYPES

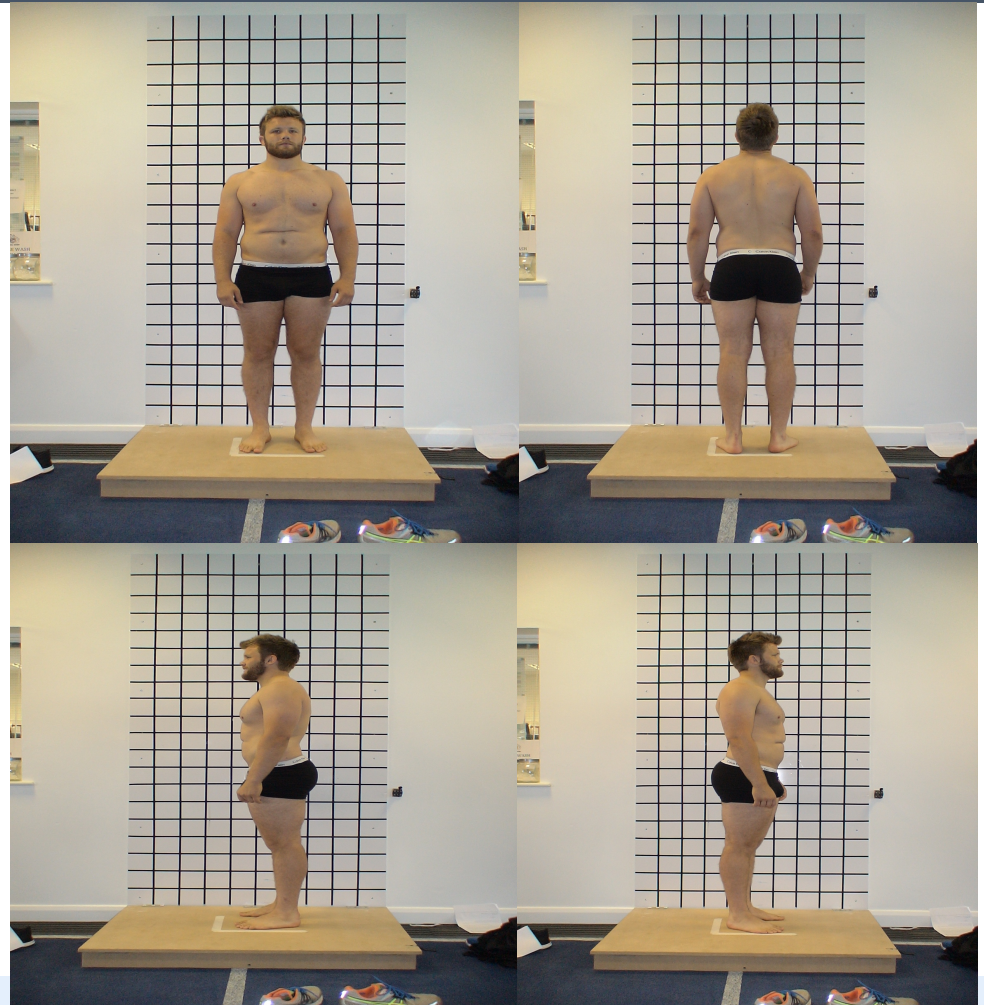


IDEAL POSTURE

- Head balance maintained with minimal muscular effort
- Eyes 'horizontal' will maintain head & neck position, influenced by upper back curve. Increased kyphosis will bring the head/neck forward, to maintain eye level the neck will over-extend ...
- Upper back in turn influenced by positions of the lower back & pelvis
- Shoulder influenced by position of scapulae, which should lie flat against the upper back, between T2 – T7 (4" or 9cm apart). Glenohumeral function influenced by position of scapula.
- Pelvis & Lower Back. Pelvis can be anterior or posterior hip axis. **Neutral position of pelvis:** ASIS horizontal; ASIS in same vertical plane as Pubic Symphysis (as used by Kendall & McCreary). ASIS & PSIS are approximately same level (normal variation of structure makes it difficult to be exact).
- Hips & Knees (Plumb line slightly posterior at hip, anterior at knee – helps to maintain balance between these joints; natural limitation of extension movements)
- Plumb line Ankle slightly anterior to lateral malleolus, through apex of arch (marked laterally by the calcaneo-cuboid joint)

METHODS OF POSTURAL ASSESSMENT

- Photos taken 2.3m away from target.
- Feet marked out on two standard lines with toes or heels touching dependent on the direction of photo
- Ideally use plumb line to determine vertical position
- Sheet either 20x20cm squares or 10x10cm squares



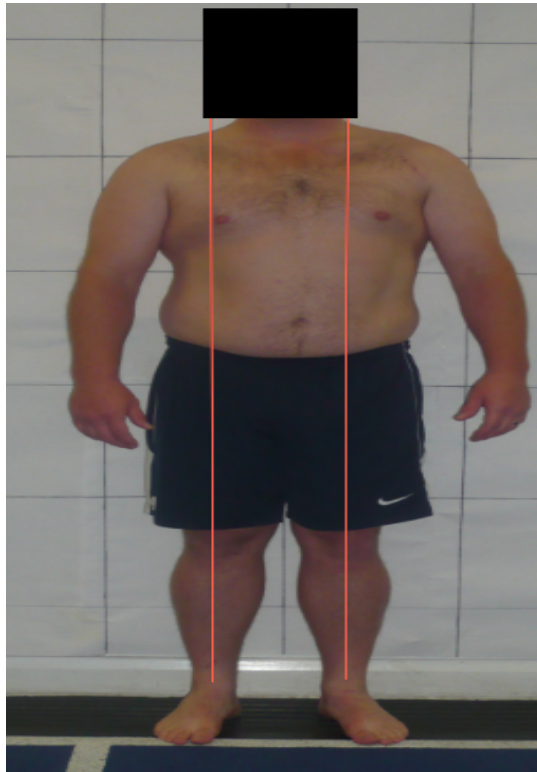
PROBLEM SOLVING POSTURE



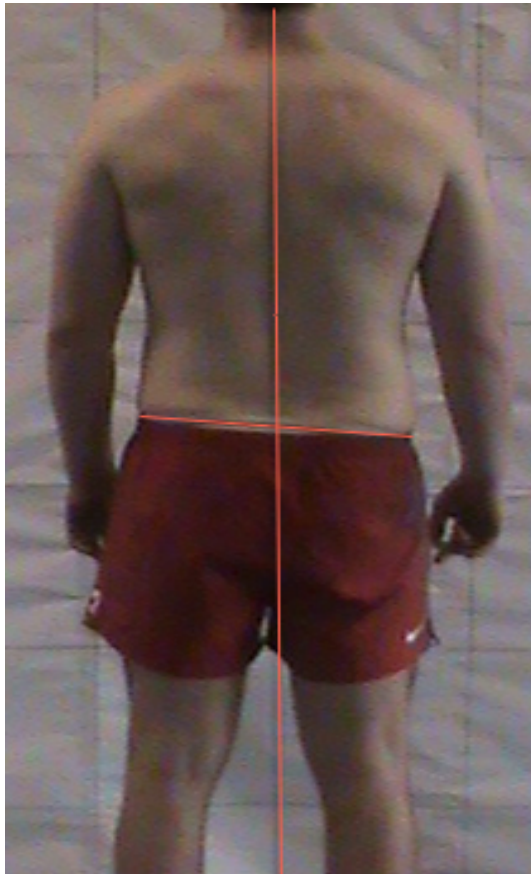
PROBLEM SOLVING POSTURE



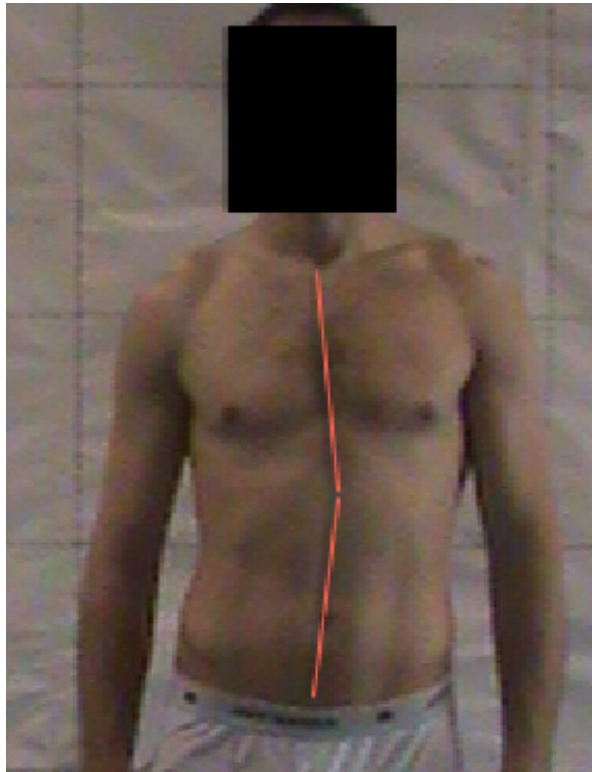
PROBLEM SOLVING POSTURE



PROBLEM SOLVING POSTURE



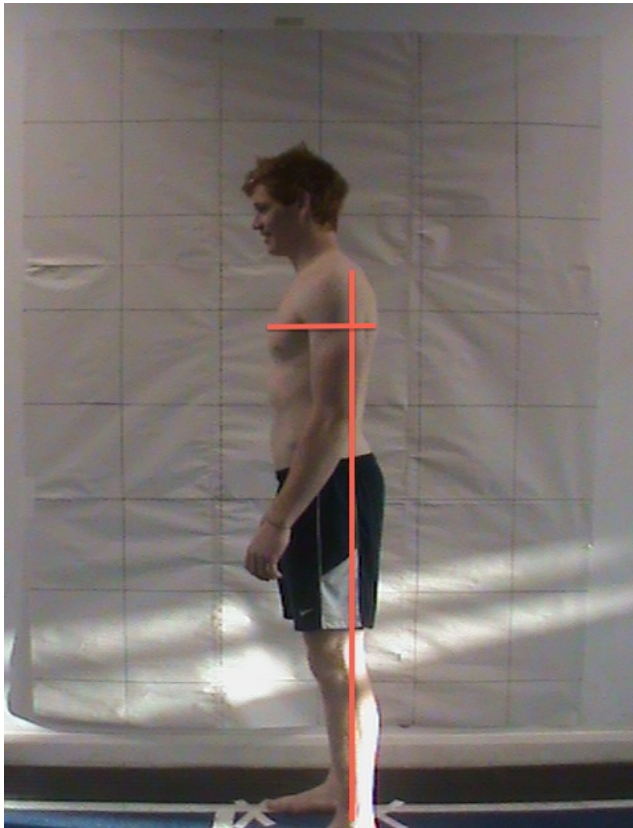
PROBLEM SOLVING POSTURE



PROBLEM SOLVING POSTURE



PROBLEM SOLVING POSTURE



PROBLEM SOLVING POSTURE

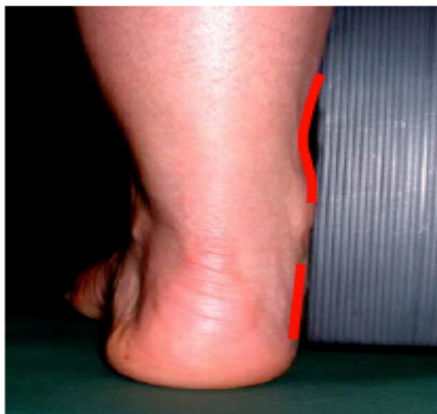


FOOT POSTURE

- FOOT POSTURE INDEX
- Way of grading foot position
- Standardised grading to allow easy of use across professions
- Good inter rater reliability

FOOT POSTURE

Supinated (-2)



Neutral (0)



Pronated (+2)



Score	-2	-1	0	1	2
	Curve below the malleolus either straight or <u>convex</u>	Curve below the malleolus concave, but flatter/ more shallow than the curve above the malleolus	Both infra and supra malleolar curves roughly equal	Curve below malleolus more <u>concave</u> than curve above malleolus	Curve below malleolus <i>markedly</i> more concave than curve above malleolus

FOOT POSTURE

Supinated (-2)



Neutral (0)



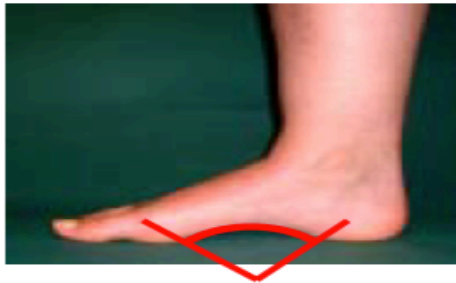
Pronated (+2)



Score	-2	-1	0	1	2
	More than an estimated 5° inverted (varus)	Between vertical and an estimated 5° inverted (varus)	Vertical	Between vertical and an estimated 5° everted (valgus)	More than an estimated 5° everted (valgus)

FOOT POSTURE

Neutral (0)



This observation should be made taking both the arch height and the arch congruence into consideration.

Supinated foot (-2)



Pronated foot (+2)



Score	-2	-1	0	1	2
	Arch high and acutely angled towards the posterior end of the medial arch	Arch moderately high and slightly acute posteriorly	Arch height normal and concentric ally curved	Arch lowered with some flattening in the central portion	Arch very low with severe flattening in the central portion – arch making ground contact

Reflection

- WHAT IS SOMATOTYPING?
- WHAT ARE THE MAIN SOMATOTYPES AND DEFINE THEM?
- HOW CAN YOU WORK OUT A SOMATOTYPE?

Reflection

- WHAT IS POSTURE?
- WHY IS IT IMPORTANT?
- WHAT ARE THE MAJOR POSTURAL TYPES OF THE BODY?
- WHAT PROBLEMS CAN ARISE THROUGH POOR POSTURE?

PRACTICAL

- Posture
- Somatotyping