Posture is the mechanical relationship of the parts of the body to each other.

It can be divided into static posture (at rest or without anticipated movement, e.g. lying, sitting or standing) and dynamic posture (in action or anticipation of action).

It changes with positions and movements of the body, and is influenced by many factors, including general health, sex, body build, strength, personal habits, environment and mood.

The Posture Committee of the American Orthopedic Association (1946) defines good posture as ‘that state of muscular and skeletal balance which protects the supporting structures of the body against injury and progressive deformity irrespective of the attitude in which these structures are working and resting.

Under these conditions the muscles will function most efficiently and the optimum positions are afforded for the thoracic and abdominal organs.’

Efficient movement needs a background posture or alignment adequate for a particular task.

Man has developed an upright posture so his hands are released for complex tasks.

**THESE AUTHORS ALSO NOTE:**

**IDEAL POSTURE**

In this state:
Forces of gravity are evenly distributed through the body so all joints are in their neutral zone.

There will be minimal wear and tear on these structures and the natural balance and correct length of muscles is maintained.

Movement patterns are normal, all vital organs are properly located without constriction and therefore function efficiently.

The line of gravity passes through a point on a level with and immediately in front of the second sacral vertebra (the centre of gravity).
The spine retains its natural curves.

The pelvis is in neutral, anterior superior iliac spine lies in a parallel line with the posterior superior iliac spine.

The knee joints are in neutral and not hyperextended.

The lower leg is vertical and perpendicular to the sole of the foot.

The line of gravity should bisect the body into two equal halves with body weight evenly distributed.

“The postural muscles have a specific purpose to maintain joint alignment against forces of gravity. They tend to be deep muscles, have slow twitch broad fibres and carry out low effort work. They fatigue slowly and act as stabilizers to allow agonists to work from a fixed base.”

**MEASUREMENT OF POSTURE**

**X-ray Imaging Method**

X-ray measurement “has the benefit of providing an objective and accurate measurement of the angle of spinal curvature,” but “it relies upon the use of ionizing radiation.”

**Plumb Line Method**

“In this method, the position of a plumb line in relation to anatomical landmark is noted and posture determined.”

In the lateral view, “the plumb line runs through the acromion, midpoint of the iliac crest, greater trochanter and in front of the ankle.”

“Whilst the plumbline method is hazard free, easy to use, cheap and reproducible, and gives a general assessment of the patient’s posture type, it cannot provide accurate objective measurements.”

**Non Contact Optical Measurement Method**

“Optical measurement systems that rely upon differences in back topography can be used to measure posture.”

“These do not require body contact, are non-invasive and harmless.”

This method “consists of a reference board and projector, CCD camera, computer and stainless steel framework. A 250 watt halogen light projects a pattern of horizontal parallel lines onto the subject. The reflected light recorded by a CCD
camera is in turn analysed by a computer to produce a three-dimensional image of the patient’s back. The process is rapid (scan time 0.02 seconds), and hazard free.”

However, this method is “expensive and bulky and therefore may have practical disadvantages.”

**POSTURE AND BACK PAIN IN CYSTIC FIBROSIS**

Many adult cystic fibrosis (CF) patients appear to have poor posture, and many also complain of persistent back pain.

These authors completed a postural / back pain study on a group of patients with cystic fibrosis and compared them to a group of age and sex matched controls, showing:

1) Back pain is very common in adults with CF.
2) Postural deformities are common in adults with CF.
3) Some of these postural abnormalities can be corrected.
4) Worsening spinal deformity is associated with deteriorating lung function.
5) Patients with the most sputum had more pain and the worst spinal deformity.
6) The postural deformity most commonly seen in CF is an increase in thoracic kyphosis.
7) An increased lumbar lordosis or a swayback of the thoracic spine on the pelvis is often noted.

“These changes cause an associated imbalance of the muscular system that will inhibit normal movement.”

“Many patients with severe lung disease are seen to adopt a flexed position when they are short of breath and they report that they find it easier to breathe that way.” [Important]

“Forward-lean sitting or standing is the preferred position in patients with chronic airflow limitation.”

“Many patients with CF are unable to lie flat due to orthopnoea and persistent coughing during the night and therefore cannot extend their spines during sleep.”

“Patients who have more sputum may have more pain and postural abnormalities because they adopt a flexed position during coughing bouts.”

“Postural deviation alters the body mechanics, causing uneven pressure on joint surfaces, ligamentous strain and skeletal muscle disadvantage.”

Associated soft tissue shortening caused by chronic altered posture may cause back pain.
Stiffness and pain in the spine and ribs may inhibit ventilation.

**TREATMENT FOR POSTURAL PROBLEMS AND PAIN IN CF PATIENTS**

“We have shown that postural deformities may be reversible.” [**Important**]

These authors “advocate that posture should be assessed in all CF patients and any abnormalities discovered treated rapidly and appropriately.”

*This is consistent with postural chiropractic techniques, such as Chiropractic Biophysics*

“Thoracic mobility is of great importance for pulmonary function and loosening contractures and stiffened joints may decrease the work of breathing.”

*This is consistent with chiropractic spinal adjusting*

Some patients have loss of flexibility due to muscle and soft tissue tightness.

“Soft tissue changes are reversible, amenable to treatment and thoracic exercises will enable stiff joints to be mobilized and soft tissues to be stretched to allow correct alignment and normal movement within the body.”

“Passive intervertebral manual mobilizations of the thoracic spine and rib joints may be of benefit to patients with respiratory conditions.”

*Very Important for Chiropractors*

“In poor posture there may be weakness in the antigravity muscles and the antagonists of tightened muscles.”

CONCLUSIONS

“Poor posture and back pain occur in many adult CF individuals and poor posture appears to be associated with deteriorating lung function.”

These “postural problems may be reversible.”

“Further studies are needed to evaluate the effectiveness of spinal mobilization and postural therapy on pulmonary function, airway clearance and back pain.”

**KEY POINTS FROM DAN MURPHY**

1) Posture is the mechanical relationship of the parts of the body to each other.
2) The Posture Committee of the American Orthopedic Association (1946) defines good posture as that state of muscular and skeletal balance which protects the supporting structures of the body against injury and progressive deformity; the muscles will function most efficiently and optimal location are afforded for the thoracic and abdominal organs.

3) Efficient movement needs a background posture or alignment adequate for a particular task.

4) With good posture, there will be minimal wear and tear on the body and joints, and all vital organs are properly placed, not constricted and therefore can function efficiently.

5) X-ray measurement of posture is most accurate and objective.

6) Many adults with cystic fibrosis have poor posture and associated persistent back pain.

7) Cystic fibrosis patients can develop the following vicious cycle: They assume a flexed posture to aid in their breathing; this alters their posture; this causes long-term soft tissue changes and stiffness; this leads to back pain; this leads to deteriorating lung function; and the cycle perpetuates.

8) “Postural deviation alters the body mechanics, causing uneven pressure on joint surfaces, ligamentous strain and skeletal muscle disadvantage.”

9) Stiffness and pain in the spine and ribs may inhibit breathing.

10) Many postural deformities are reversible with appropriate treatment.

11) Posture should be assessed in all cystic fibrosis patients and any abnormalities discovered treated rapidly and appropriately.

[This is important for postural chiropractic techniques, such as Chiropractic Biophysics]

12) “Thoracic mobility is of great importance for pulmonary function and loosening contractures and stiffened joints may decrease the work of breathing.”

[This is consistent with chiropractic spinal adjusting]

13) Posture related soft tissue changes are reversible, enabling stiff joints to be mobilized and soft tissues to be stretched to allow correct alignment and normal movement within the body.

14) “Passive intervertebral manual mobilizations of the thoracic spine and rib joints may be of benefit to patients with respiratory conditions.” [Very Important]
THESE AUTHORS PROPOSE THE FOLLOWING VICIOUS CYCLE

Deteriorating Lung Function

Inhibited Airway Clearance

Increased Sputum

Increased Breathlessness

Back Pain

Coughing

Poor Posture