The body uses the brain, nerves, sense organs and its musculo-skeletal system, (i.e. bones, muscles, tendons and ligaments) to be able to either move or keep joints still. The combination of movement and stabilisation enables us to:

- Adopt fairly static positions, e.g.
  - Standing
  - Sitting
  - Lying
  - Kneeling

- Balance, e.g.
  - To be able to stay fairly still by using very small movements
  - To be able to get back to the position we were in if we are put slightly off balance
  - To step or reach to ‘save’ ourselves if we are put more off balance

- Move in order to do something, e.g.
  - Reaching our arm to pick up a cup
  - Turning our head to look at something
  - Walking to the toilet
  - Transferring from bed in to a wheelchair

- Move to avoid harm to ourselves, e.g.
  - Moving our hand automatically if it touches something hot
  - Moving our foot away automatically if it stands on something sharp
  - Automatic bending of our knee if our calf muscle is being over-stretched.

**Movement and ‘Normal Movement’**

Movements are normally ‘goal directed’ (i.e. happen in order for us to do something) and start with the body’s need to move. This idea or need for movement then sets a sequence of other events in to action:
Definition of Normal Movement: “Normal movement may be considered as a skill acquired through learning (or development) for the purpose of achieving the most efficient and economical movement or performance of a given task and is specific to the individual.” (S. Edwards, 2002).

Although no individual is the same as another, we can get a good idea about ‘normal movement and posture’ by looking at the way a person without neurological damage holds themselves and the way they move.

Various systems in our body allow us to have ‘normal movement’, these are:

**The motor system**

The nerves and muscles that control movement.

**Sensation**

The information the body gets from itself and its surroundings, its senses:
• The skin (touch, pain, pressure, temperature)
• Proprioception (information gained by sense organs in muscles and tendons that tell the brain what position joints, and different parts of the body are in)
• Vestibular (includes the balance organ in the ear. This is what is mainly responsible when a person suffers from sea-sickness)
• Visual (information gained by the eyes)

**Perception**

How we make sense of the world around us. It concerns things such as judging distances and depth, knowing where our body is in space, and being able to relate one object or body part to another.

**Tone**

A state of resting muscle activity, which can be influenced by many external factors (e.g. temperature, anxiety, wellness and pain).

‘Normal tone’ can be described as high enough to withstand gravity, but low enough to allow selective movement. Spasticity is a state of high tone.

**Planes of Movement**

Movement happens in 3 main planes:

- **SAGITTAL** (Forward / Backward)
- **FRONTAL** (Side to Side)
- **HORIZONTAL** (Rotation)

Movement doesn’t often happen in just one plane, it is normal to have a combination.

**Posture**

Posture can simply be defined as a ‘position’ or ‘arrested movement’. It considers the position of the body and its relationship to whatever is supporting it (i.e. a chair, the floor, a table that’s being leaned on).
As with movement, different postures are used for different purposes and goals.

Although it is common for people to talk about ‘good posture’ or ‘bad posture’ they are really talking about ‘good alignment’ and ‘bad alignment’.

**Alignment and ‘Normal Alignment’**

Alignment is the relationship between the positions of different body parts. It can be used to describe:

- **BIG AREAS**
  - E.g. The whole body’s alignment in standing.
  - Looking for example at the position of the head, trunk and legs.

- **SMALL AREAS**
  - E.g. The alignment of the wrist.
  - Looking at the position of the different bones in the lower arm and hand.

‘Normal alignment’ is the alignment that we would expect an average individual without neurological or other physical problems to have.

“For movement to be effective the body must be in a ‘state of readiness’, which involves the body parts being in appropriate alignment.” (Carr and Sheppherd, 1990).

**Development of Normal Movement**

The bits of our body that are concerned with movement start developing before we are born.

The order in which they develop is from the middle (the spine and trunk) outwards (to the hands, fingers, feet and toes).

Movement develops from gross, big movements to fine, selective movements.

**Trying to Relearn or Improve Movement, Posture and Alignment**

- It is useful to consider how a person without neurological damage does a movement, and work towards doing that movement in the same way.
- It is important to consider alignment and try to get it as appropriate and as close to what we expect as possible.

- It is important to consider the different planes, and use them appropriately. Rotation is something that is often forgotten.

- When trying to relearn or improve movement it normally works best if we do it in the same order as when we develop.

**Muscle Power, Strength and Weakness**

The reason for muscle weakness in somebody with neurological problems is not straightforward and often causes confusion. This is because people think about strength without considering the damage to the neurological system.

### Somebody WITHOUT Neurological Problems

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>MUSCLE WEAKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAUSE</td>
<td>DISUSE</td>
</tr>
<tr>
<td></td>
<td>(Muscles not being used regularly or at all.)</td>
</tr>
<tr>
<td>THERAPY</td>
<td>THERAPY</td>
</tr>
<tr>
<td></td>
<td>Strength training exercises (with or without weights.)</td>
</tr>
</tbody>
</table>

### Somebody WITH Neurological Problems

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>MUSCLE WEAKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAUSE</td>
<td>NEUROLOGICAL</td>
</tr>
<tr>
<td></td>
<td>(Messages to and from weak muscles not getting through properly.)</td>
</tr>
<tr>
<td></td>
<td>DISUSE</td>
</tr>
<tr>
<td></td>
<td>(Muscles not being used regularly or at all.)</td>
</tr>
<tr>
<td>THERAPY</td>
<td>THERAPY</td>
</tr>
<tr>
<td></td>
<td>Priority:</td>
</tr>
<tr>
<td></td>
<td>Work on ‘Normal Alignment’ and ‘Normal Movement’</td>
</tr>
<tr>
<td></td>
<td>Secondary:</td>
</tr>
<tr>
<td></td>
<td>Consider strength training exercises, (although need to take care and monitor closely as these can sometimes be detrimental).</td>
</tr>
</tbody>
</table>
‘Associated Reactions’

In some cases, movements can happen when they are associated with effort, (e.g. when trying to stand or walk, when yawning or sneezing) – these are termed ‘associated reactions’ and often appear to happen on their own.

Some of the common movements include the elbow bending, the hand making a fist and the foot pointing downwards. These movements are thought to be pathological and are not true movements controlled by the individual. If they are repeated over and over it can be extremely detrimental.

When trying to manage associated reactions it is advised that:

- Try and reduce the movements when they occur, (e.g. using a sound arm to stretch out the affected side, trying to use the muscles to move the body part in the opposite direction).

- Work on ‘Normal Alignment’ and ‘Normal Movement’.