Shirley Jensen, Physiotherapist, says of using the Saddle Seat as a treatment aid:

1. To fix the distal end of the lower limb muscles for exercise the position of natural balance offers the therapist opportunity to fix the distal end of the lower limb muscles for exercise.

When therapists are assisting a patient to regain muscular strength for standing and walking, proprioceptive facilitation if often used to stimulate lower limb muscles for postural and dynamic function.

When this is undertaken in non-weight bearing exercises with the client sitting or lying, the proximal end of the muscle is fixed. This does not occur in normal standing and walking.

Using the Saddle Seat, the client can be assisted to exercise in a position closely resembling normal standing, with the muscles of the lower limbs being fixed at the distal end and the load in its natural relation to the joint for standing and walking.

2. Improve balance and symmetry

The position of a person on the Saddle Seat allows the therapist to encourage function for both sides of the body more easily as there is less likelihood of people (with such injuries as CVA) sitting asymmetrically or falling into one-side neglect.

Independent sitting balance is facilitated and improved through using the Saddle Seat. Half rising, which stimulates the lower limb proprioceptors and mobilises the joints, can be used as an intermittent weight bearing exercise in a secure position. All this leads to improvement in muscle tone in the lower limbs and marked gains in confidence.

The Saddle Seat position releases the pelvis from backward pull of the hamstrings (this happens once the hip joint is flexed past 60 degrees as when sitting on a conventional chair). Thus, the pelvis can be used in a greater range of small, controlled movements.

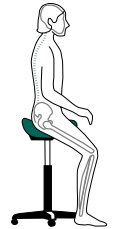
3. Improve hand position, hand coordination and upper limb movement

Head position will be improved because the trunk is stable and symmetrical. The person on a Saddle Seat can now use trunk, upper limbs, neck and head freely and confidently. The person can react to righting stimuli, thus increasing balance, strength and tone. Head control is important for standing and walking as well as eye–hand coordination.

In Summary

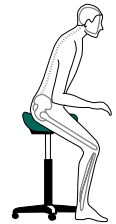
- The Saddle Seat assists therapists to promote standing and walking from a more natural position.
- This position builds confidence in the seated person's ability to balance and maintain body symmetry.
- Pelvic awareness can be developed, promoting pelvic stability.
- Eye focus and eyehand coordination, as well as range strength and precision of upper limb movement, improve as a result of good posture.

The beneficial effect of the Saddle Seat on spinal position



Spinal position on Saddle Seat.

Spinal position on flat seat.

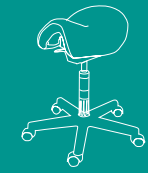


Spinal position leaning forward on Saddle Seat; action takes place at hips.

Spinal position leaning forward on flat seat; action takes place at waist.

THE BAMBACH SADDLE SEAT PTY LTD
102 OLD PITTWATER ROAD, BROOKVALE, NSW 2100, AUSTRALIA
PHONE: 61 2 9938 5622 FAX 61 2 9938 3973
WORLD WIDE WEB ADDRESS: http://www.bambach.com.au/~bambach
E-MAIL ADDRESS: bambach@bambach.com.au

The Bambach Saddle Seat in rehabilitation



On a flat seat the pelvis rocks backwards, changing the natural 'S' shape of the spine to a 'C'.

With the pelvis in its natural forward position, the lumbar spine assumes its natural 'S' shape.

The Saddle Seat allows the pelvis to adopt its natural position which, in turn, maintains the natural 'S' shape of the spine.

The Musculo-skeletal System

Good design recognises that our body has a centre of gravity (as does each limb) and maintaining posture close to the neutral centre of gravity will reduce static muscle fatigues.

— Ergonomics Standards Australia HB59, 1994.

The Position of the body in balance

The upright standing position is physiologically highly efficient. Balance is dynamic rather than static, and deviations from the ideal perpendicular positions are small. Thus energy expenditure is not raised much above the resting level and no muscle group is subject to consistent static loading at more than a very low level.

— Stephen Pheasant, 'Ergonomics, Work and Health', McMillan, 1991.

A good sitting position maintains the spinal curves normally present in the erect, standing position.

— R.A. McKenzie, 'The Lumbar Spine', Spinal Publications', 1981, New Zealand.

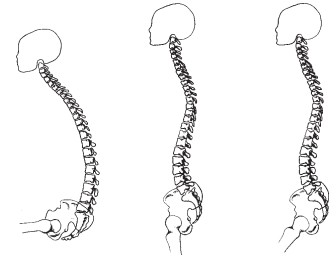


Figure 1. Spinal position on flat seat, standing, and on Saddle Seat.

Sitting on a flat seat (pelvis rotated backwards)

Standing (pelvis neutral)

Saddle Seat position (pelvis neutral)

Conventional flat seats cannot prevent postural collapse, as these seats all require the pelvis to rock back as shown in Figure 1.

To correct postural collape the sitter must compensate with the spinal muscles in order to sit up 'straight' (and push the lumbar spine back into lordosis, in opposition to a lower spine that is curving forcefully backwards into kyphosis). The abdominal and spinal muscles are unbalanced because the spine is out of its normal curvature.

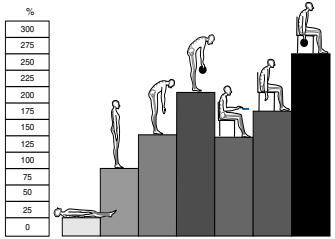
The highest pressure occurs while sitting in a slumped forward position. This is because when changing from a standing to a sitting position, the pelvis rotates towards the rear and the sacrum adopts a more upright position. The normal concavity (lordosis) of the lumbar region is changed to a convex curve (kyphosis), and the discs assume the same wedge shape as when the spine is bent from the waist.

— 'Ergonomics, The Human Factor', Standards Australia, SM HB59, 1994.

Ideally, the centre of gravity of the seated person should be over the supporting base, the ischial tuberosities. On a flat seat the supporting base is behind the upper body rather than under it.

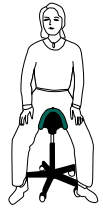
For the person seated on a Saddle Seat, the centre of gravity is over the ischial tuberosities, just as it is in standing.

In the Saddle Seat the anti-gravity muscles are at, or close to, their neutral, balanced position. Muscle fatigue due to bad posture is minimised.



Relative increase/decrease in intradiscal pressure in the lumbar spine, standing vs. sitting posture (standing = 100%)

Adapted from 'Towards a better understanding of low-back pain: a review of the mechanics of the lumbar disc', by Alf Nachemson. Published in *Rheumatology and Rehabilitation* (1975).



Other benefits for rehabilitation

A counter to unilateral neglect

One-sided neglect is counteracted with the Saddle Seat as the contour of this seat centres the body and the astride position maximises sensory input from the affected side. It is easy to work towards putting equal weight through both legs to the feet using plantar contact. Weight taken through the legs and feet encourages proprioceptive feedback. Midline positioning is reinforced by visual as well as sensory cues.

The Saddle Seat places the legs on either side of the body. Feet are in full plantar contact.

The midline is clearly seen and felt (the visual cue can be simply keeping the nose over the front curve of the seat which is easier in the straddle position).

The fact that abdominal and back muscles are in balance assists normal functioning of anti-gravity righting reactions, contributing to a stable position in seating which is active and upright rather than slumped. The midline is therefore more easily held.

Improved hand control

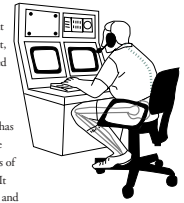
A flat seat causes the scapula, clavicle, and humerus to rotate forward. This happens because, on a flat seat, the pelvis tilts back and the spinal curves reverse, resulting in the lumbar cervical curves flattening. Good arm–hand control needs a stable, symmetrical shoulder girdle. This is difficult on a flat seat as not only is the spine in a 'C' curve but the trunk must lean over the thighs, or 'lap', to reach the task.

In the Saddle Seat position the trunk is supported and the shoulder blades are retracted in their neutral position, providing best mechanical advantage for forearms and hands while working.

On the Saddle Seat the thighs, shoulders and arms are relaxed in a neutral position and fall to each side of the body. The seat allows really close access to work surfaces and work tasks. This means that the hands do not have to act at or near the end range of movement, giving more accuracy and power. In addition, eyesight is maximised and the head is closer to the work without having to lean forward.

Back Pain Management

The position of the person on the Saddle Seat is one where the spine has least intradiscal pressure. Pain from trauma to the spine, especially the lumbar spine, is minimised. The Saddle Seat position shifts axial stress of the disc and shares it with the posterior elements (ie the facet joints). It also removes the excessive traction/tension on the posterior ligaments and facet joint capsules while reducing isometric tension in the intersegmental and long strap muscles of the lower back.



When using a Saddle Seat, tolerance for seated work can increase from zero to normal for a working person.

Integrated with correctly planned modification to the work station, many people find they can return to seated work and/or avoid taking time off for back, neck and shoulder pain by using a Saddle Seat.

Sitting on a flat seat encourages postural collapse. Sitting on a Saddle Seat encourages postural correctness.

Activities of daily living

The position of a person on a Saddle Seat facilitates function of upper and lower limbs so that self-care activities are easier to perform. This is true for many tasks self care, domestic (eg cooking, dressing, washing up, eating) and others, such as hobbies (eg playing a musical instrument, craft work) where active use of the limbs and good functional position is desirable.

Carers, who when showering people must lift the person to their feet for transfers, find that the Saddle Seat facilitates this activity. The client can come to standing more easily and is in a position from which is it much easier to transfer, putting less stress on the back and body of the cater.

Hip replacements

People who have had hip replacement find that the position of hip abduction and some external rotation is a beneficial position for seated work. This is because there is a position of maximal joint surface contact (ie close packed position) where, with abduction and external rotation of the hip, there is close to maximum contact of the head of femur with the acetabulum. This is the position of comfort.

- As the hip is not flexed past 60°, which is when the hamstrings act on the pelvis, there is less tension around the joint.
- The hip is abducted and supported in its resting position.
- Being in a sitstand position of half standing is very helpful, as the person does not have to go through the whole range of hip movement to stand up or sit down.
- Activities such as teaching (having to get up and down to a board), drafting or process work are easier.

Physiological function

Thoracic abdominal and pelvic spaces are maximised resulting in improved breathing and function of internal organs including blood supply. Postural collapse compresses and restricts these cavities.

Developing Pelvic Stability

In a Saddle Seat the importance of the pelvis can be emphasised to encourage and develop pelvic control. Good pelvic stability is essential for sitting, standing and walking. Controlled movement of the pelvis is necessary for good spinal position. Many people are not aware of how to use the pelvis as a critical part of postural change and spinal curves. This education, which will have great benefit, is easy from a Bambach Saddle Seat.