



Suggested title: Nordic Walking as a Rehabilitation Tool for Chronic Low Back and Leg Pain: A case study

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Introduction

Back pain is a common condition with around 80% of the population likely to experience it at some point in their lives (Palmer et al 2000). Pain may be related to any of the complex musculoskeletal or neurological structures of the spine, and can present as a localised pain within the back or referred into one or both legs. In most cases there is no serious underlying cause, no specific injury or pathology can be found (Nachemson et al 2000) and the pain resolves quickly. This is often termed non-specific back pain. Serious injury, disease or permanent damage to the back is rare (Roland et al 2009) and long term problems with pain and incapacity are associated with a number of other, non biomedical issues (Kendall et al 2011).

Many risk factors are associated with the development of back pain and include smoking, reduced physical activity, being overweight, stress and depression. Back pain may be accompanied by many other health problems and the National Institute for Health and Clinical Excellence (NICE) estimates that treatment of all types of back pain costs the NHS in excess of £1,000 million per year (NICE 2009).

According to the UK charity Back Care, people who frequently participate in sport or other physical activity not only experience better overall health, but also better back health . Regular physical activity can also be extremely beneficial in helping an individual manage and overcome their back pain (Roland et al 2009). Current research suggests that no one particular form of exercise is recommended over another, but NICE guidelines conclude that structured exercise is a valuable part of treatment for persistent or recurrent non-specific low back pain (NICE 2009).

Leg pain may be associated with back pain, and reluctance to weight bear on a painful leg may cause stress on muscles or spinal structures, which may further aggravate existing back pain. While the strength muscles of the leg, such as the quadriceps, play a key role in walking and other movement, the smaller “stabiliser” muscles are essential for support of the body along with protection of joints and other tissues. This is facilitated by proprioceptors, which are receptors that relay information internally about motion, tension and pressure, ultimately making the brain aware of the body’s movement and position. Pain related to any of the musculoskeletal structures, reduced activation of the stabilisers, or poor proprioception, may result in a reduced ability to walk normally or perform other normal movements comfortably.

Back and leg pain both affect gait (the walking pattern) and can result in a poor posture with functional rigidity when walking. Functional rigidity occurs when the body tightens up in an effort to protect itself, but this in turn limits movement (Elphinston 2013). The effects can be seen as a change in walking pace, with loss of arm swing occurring when gait becomes slow. In turn, this creates a loss of body rotation accompanied by shorter strides associated with a lack of hip motion. This may impact on confidence when walking, with a fear of losing balance and an inability to react sufficiently to uneven surfaces or potential trips. Hills may prove particularly challenging, with insufficient gluteal muscle activation, strength and therefore propulsion to walk up a hill, and lack of trunk control or quadriceps strength to come down hills well. Walking may be tiring or painful leading to greater loss of function, and in some cases, requiring the support of a walking aid to get around.

Intervention at an early stage to prevent progression into a vicious cycle of reduced mobility is key and walking as a form of exercise has many health benefits which all aid physical recovery (Roland et al 2009) including:

- Improving fitness
- Strengthening and maintaining muscle power, flexibility and bone density
- Releasing natural chemicals that reduce pain

In addition, the simplicity and low costs involved make walking an extremely accessible form of exercise.

Nordic Walking

The technique of Nordic Walking can be used as a simple, effective rehabilitation and management tool for patients suffering from low back and leg pain, and provides additional benefits over and above regular walking. Nordic Walking is performed using specially designed poles (which may help to reduce weight taken through the joints, although the evidence is inconclusive), thereby reducing stress on the muscles and joints. Nordic Walking claims a number of additional benefits over normal walking such as increased oxygen uptake and calorie expenditure (Morse et al 2001, Church et al 2002), improved posture and gait, improved functional capacity in older people (Parkatti et al 2002) and ability to enhance mood (Stoughton 1992). It may also be helpful in terms of supporting weight loss, and promoting back and heart

health (INWA 2011). In addition, the technique can enable an individual to work towards more natural and fluid movement, and allows for steady progression through different environmental terrains which helps to build up balance and stamina. Finally, there can be many social benefits associated with being part of a Nordic Walking group including distraction from thinking about “how” to walk correctly, restoring some normality to life, discovering that others may well have experienced similar health issues, and being able to participate in a normal activity with friends and family.

Case Study

Nordic Walking has been used in a case study to illustrate its potential role as a rehabilitation tool. The patient, a 48 year old woman, presented with the following medical history: chronic low back and leg pain on the left side which was recently aggravated by a fall from her horse. Clinical findings on examination included:

- Limited lumbar movements
- Occasional left foot pins and needles and numbness
- Normal reflexes
- Painful resisted muscle tests with left leg
- Rounded trunk posture when standing
- Poor weight bearing on left leg
- Reduced arm swing on the left
- Reduced body rotation when walking
- Compensation on the right side of the body with right arm and trunk pulling down when walking caused by overactivity of the latissimus dorsi muscles (7; Figure 1)

Figure 1: Back view photo reveals right arm pull down, which can be seen more clearly because of the folds in the clothing

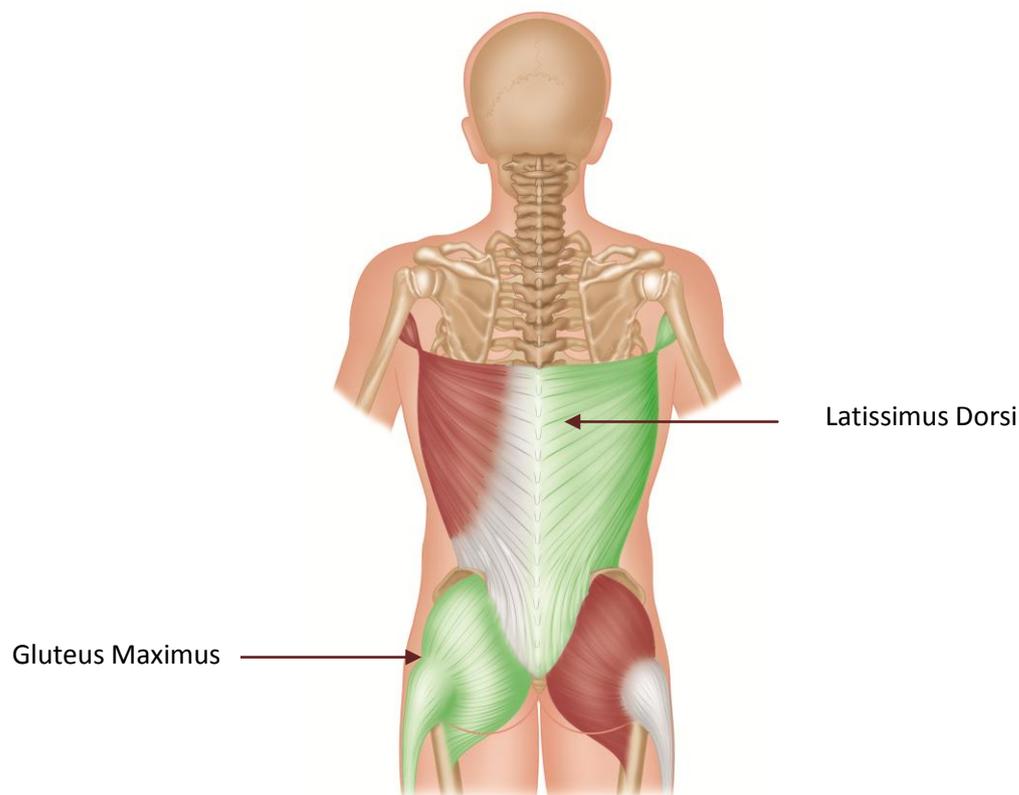


The treatment given to the patient previously in the clinic included manual therapy, soft tissue release, and a remedial exercise programme based on the JEMS Movement approach (Elphintson 2008). Nordic Walking was introduced after an initial activity focusing on foot movements, posture and weight bearing to help activate the stabilisers and prepare for walking. The Nordic Walking poles helped the patient to equalise weight bearing, enabling achievement of a more balanced

posture by allowing the left side of her body and her left leg to take more weight, thereby releasing some of the compensation from the right side. A relative lack of trunk stability had resulted in compensatory stabilising strategies on the right side with the latissimus dorsi becoming overactive in response to a weak gluteus maximus muscle on the left (Elphinston 2008), therefore restoration of trunk stability was an initial priority to prevent this issue from recurring. Single poling, with a pole in the left hand only, was used for part of the session to increase the patient's awareness of her left arm and trunk, and to enable the right arm to start relaxing. Once increased activation of the stabilisers had been achieved with better posture and improved weight bearing, allowing improved stride length and hip motion, better activity in the gluteus maximus, a reduction of over activity in the right latissimus dorsi was possible. This enabled the right arm to release and swing more freely which was necessary prior to working on body rotation.

Loss of counter body rotation results in loss of elastic energy created by the myofascial sling (Figure 2) since it is thought that the sling acts like an elastic band – when the body rotates energy is stored as it contracts and released when it relaxes, helping propel the body forward and allowing the transfer of forces across the body and through the limbs .

Figure 2: Myofascial sling (Elphinston 2008)



Improved body rotation, where the arms are allowed to swing freely, results in a larger range of motion with the elasticity creating momentum. Rotation increases the tension through the myofascial sling which can help to stimulate activation of the gluteal muscles on opposite sides of the body (Elphinston 2008, 2013). In turn, they

are then able to generate more power for the propulsion required for walking, resulting in a lengthened stride with improved hip motion. The movement inherent in rotation reduces tension in the spinal muscles that can be a contributing factor in pain and discomfort. In the patient's case, she had been walking slowly due to back and leg pain, which in turn reduced her arm swing, and consequently her body's counter-rotation. With the pain having already compromised efficiency in her gluteal muscles, and trunk and pelvic stabilisers, this lack of rotation further reduced her ability to access these muscles and walk more effectively.

The patient was able to practice and improve her arm swing technique using Nordic Walking poles to give extra momentum to the swing (Figure 3).

Figure 3: Swinging the Nordic Walking poles to improve arm swing technique



This case considers the interventions made in a single 1 hour session with the patient which enabled her to achieve an improved posture when walking along with improved dynamic control of the trunk. On observation her weight bearing appeared to become more symmetrical and she had better acceptance of weight through the left leg, and increased awareness of her left arm and leg. Body rotation was also improved with the consequent immediate results of increased walking speed and fluidity of movement.

Conclusion

In this case study Nordic walking enabled the therapist to progress rehabilitation into functional outdoor walking using the principles of Nordic walking technique applied with a professional understanding of the underlying condition, and drawing on techniques to improve movement efficiency and fluency.

Nordic walking, delivered by an appropriately qualified instructor who is also a physiotherapist can be a useful adjunct to standard physical rehabilitation for progressing function outside of the clinic, and can support a patient to take up regular independent walking exercise by increasing confidence that it is safe and effective.

In summary, Nordic Walking is an accessible exercise technique which may help to reduce back pain and tension, enabling the individual to move more freely and feel the benefits of regular physical activity. As the individual progresses, stamina and fitness is likely to increase, which may help reduce the risk of longer term health problems and the risk of recurrent or persistent back pain and health issues associated with an inactive lifestyle.

Tips for Nordic Walking Instructors working with people with existing back and/ or leg pain:

- Aim to achieve some improvement in walking posture in the first session as this will increase activation of the deep trunk stabilisers and help establish equal weight bearing.
- Any side-to-side trunk movement observed is likely to be associated with loss of body rotation and/ or poor use of one arm.
- Practice arm swings while walking, and if necessary standing still, to regain the feeling of rotation and progress into body rotation while walking.
- Avoid steep or long hills in the early stages until a good basic technique has been established as these can aggravate pain if there is insufficient muscle power for effective propulsion.

Note:

The case study described here is based on a case presented at the Nordic Walking UK Instructor Conference 2011 by Heather Watson, a Chartered Physiotherapist with a special interest in movement and exercise. Heather is a qualified Nordic Walking Instructor and combines her knowledge and expertise as a Specialist Musculoskeletal Physiotherapist, and her educational experience as a national Tutor for the Joanne Elphinston Movement Systems (JEMS) with her skills as a Nordic Walking Instructor.

For more information about Heather Watson and her Physiotherapy and Nordic Walking services visit www.designed2move.co.uk

Nordic Walking technique instruction should only be conducted under the guidance of a fully qualified Nordic Walking Instructor: For more information about Nordic walking and to find a qualified instructor please visit www.nordicwalking.co.uk . For clients with significant health issues Nordic walking Instructors should also hold an Exercise Referral qualification or be a qualified health professional.

To find a JEMS certified practitioner please visit http://www.jemsmovement.com/Find_a_JEMS_Practitioner

If you are a fitness professional, Nordic walking instructor or a clinician interested in finding out more about JEMS Movement approach please visit www.jemsmovement.com

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Declaration

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