

# Common muscular-skeletal injuries among nurses and the orthotic prescription

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## Introduction

Nurses, like the rest of us, often suffer from the same ailments as anyone working in the proverbial 'salt mine'. However, these health professionals tend to work longer hours standing, move around a lot more and perform countless physical tasks on a daily basis.

Two of the most common problems encountered by nurses are sore feet and back pain. Whether it is acute pain or chronic pain there is no doubt that it interferes with a person's well-being, productivity and even general state of mind. Causes of sore feet are usually due to overuse of soft tissue and shear forces exerted over joint areas, whereas spinal overuse injuries are caused by damage to the spinal disks and vertebrae. The causes of overuse injuries are contributed by intrinsic, extrinsic and training factors. These factors include elements such as smoking, overpronation of the foot, and obesity.

Disc herniation, spinal stenosis, and spondylolisthesis are among conditions that fall under the umbrella term 'Degenerative Disk Disease' (DDD). The term Degenerative Disk Disease is exactly what it says and describes degeneration of the vertebral disks usually caused by age and/or injury.

Symptoms include:

- Pain that ranges from nagging to severe and disabling
- Pain that affects the low back, buttocks and thighs
- Pain in the neck that may radiate to the arms and hands
- Pain that is worse when sitting
- Pain that gets worse when bending, lifting or twisting
- Pain that lessens when walking and moving
- Pain that lessens with changing positions often or lying down

- Periods of severe pain that come and go, lasting from a few days to a few months
- Numbness and tingling in the extremities
- Weakness in the leg muscles or footdrop may be a sign that there is damage to the nerve root

## Biomechanics of wear-and-tear on the spine

In its simplest form, the biomechanics of DDD can be illustrated through three phases: firstly the structural change in the intervertebral body (as the biggest load-bearer), typically in the form of a disk prolapse which secondly leads to uneven force distribution exerted on the vertebral bodies themselves, which in turn (due to narrowing of the disk spaces) causes compression on the nucleus body of the intervertebral disk.

## Summary

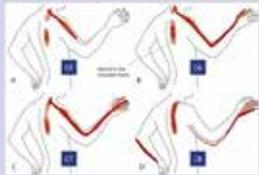
Intervertebral disk → damage to annulus (fibre tears) = loss of disk space + bulging (herniated disk). Reduced disk space → spinal compression (radiculopathy) → osteophyte formation + facet joint arthritis = increased load on neural arch. End-plate damage → decompresses nucleus → nucleus may protrude into vertebral body → develop inflammation. Damage is irreversible in the older population due to a decrease in healing potential.

Tables I and II list just some of the injuries that not only cause pain, but also affect our biomechanics.

## Orthotic intervention

In order to relieve pain and improve biomechanics, the orthotist will look at contributing risk factors of the mentioned pathologies in order to write an appropriate prescription and manufacture and/or fit the necessary orthosis.

**Table I.** Common DDD conditions and their pathology

Back pain	
Chronic neck strain/sprain	A soft tissue injury which affects muscles, tendons (sprains) and ligaments (sprains). Inflammation caused by constant flexion and extension movements marked by stiffness, swelling and localised pain at the site of inflammation.
Herniated lumbar disk	Also called 'slipped disk' occurs mostly in the lumbar area and is often attributed to working on low surfaces, such as beds where nurses bend over patients. Intervertebral disks are divided into the outer flexible annulus fibrosis and the inner jelly-like nucleus pulposus. Overuse movement in the sagittal plane (forward bending) causes the nucleus pulposus to push against the outer annulus fibrosis ring, thus causing low back pain.
Spinal stenosis	Thinning (narrowing) of the disk spaces of especially the cervical and lumbar vertebrae. Narrowing puts pressure on the nerve canal which in turn causes pain, tingling, numbness and muscle weakness.
Spondylolisthesis	When a stress fracture in the facet joint increases to such an extent that it can no longer stabilise the spine causing the bones in the vertebrae to slide forward (anterolisthesis) and backward (retrolisthesis) over each other. The vertebra most often affected is L <sub>5</sub> . Pain, weakness, tingling and tightness affecting the lower back, buttocks, hips and hamstrings.
Spondylosis	A collective name for conditions occurring from one or other disk-degeneration disease, including spondylolisthesis. It also refers to degeneration in the facet joint although this degeneration is less severe and the facet joint is still intact.
Cervical radiculopathy	 <p>Pertains to nerve root damage or 'damage at the root of the nerve'. Symptoms include pain, numbness, and weakness sometimes associated with occipital headaches.</p>

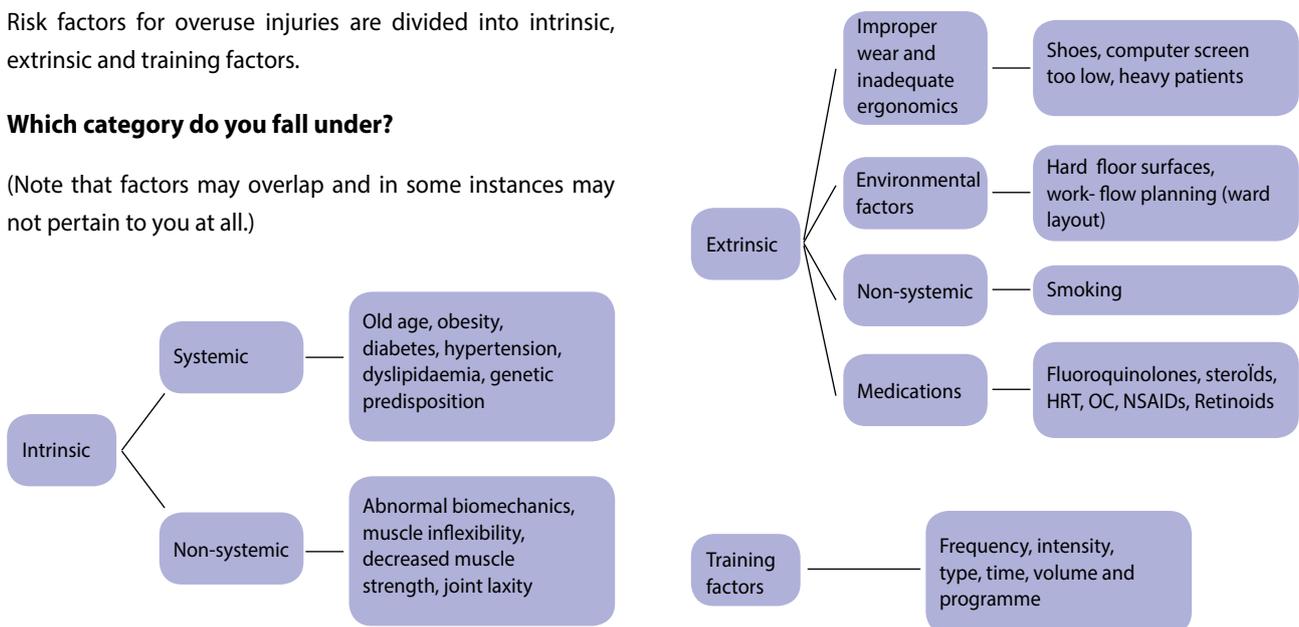
**Table II.** Some common conditions and their pathology

Foot pain	
Overpronation injuries	
Plantar fasciitis	A painful plantar injury felt at the heel at the point of origin of the plantar fascia. Pain is worse in the morning with the first steps and improves somewhat as the fascia warms up and expands. The same sharp pain often flairs up again as the day progresses and the inflamed fascia rubs over the bony prominence of the calcaneus. Plantar fasciitis is very common among people who stand long hours or walk long distances. Other causes, apart from overpronation, are: overweight, pregnancy, growth spurts and medicines.
Morton's neuroma	Pain between the third and fourth metatarsals may be the result of a thickening of the nerve which leads to pressure causing not only pain but also a burning sensation under the ball of the foot.
Achilles tendonitis	The triceps surae connects with the foot through the Achilles tendon. Tendonitis describes inflammation of the tendon caused by overpronation and overuse among other causes.
Causes of other foot problems	Arthritis, diabetes, low back pain, metatarsalgia and tibialis posterior dysfunction

Risk factors for overuse injuries are divided into intrinsic, extrinsic and training factors.

**Which category do you fall under?**

(Note that factors may overlap and in some instances may not pertain to you at all.)



## Orthotic prescription

Foot orthotics are used to treat various lower extremity, hip and spinal conditions. As mentioned in the risk factors these conditions may be the result of poor biomechanics, lifestyle disease or even medication.

With foot orthotics the orthotist is able to address muscle imbalances, and re-align and adjust the biomechanics of the foot and ankle.

### Which foot orthosis do I need?

Experience has taught me (as an orthotist) that for the majority of foot conditions custom orthotics are the best option for maximum results. This, however, does not mean that all clients need custom orthotics.

Depending on the orthotist's assessment, she may decide to either apply modifications directly to the client's shoes (normally the shoes in which the client spends the most time) or prescribe a prefabricated innersole instead.



Spinal orthotics or 'back braces' and 'lumbar corsets' as they are commonly known, may be the most well-known orthoses in our field simply because they are prescribed so frequently. Most nurses will tell you that they have seen at least once how a soft spinal orthosis is fitted, or was involved with patient education.

Incidentally, all of the spinal diagnoses discussed here are the same conditions many patients are treated for as well; suffice to say health professional and patient share the same pains in the back.

Spinal orthotics are often wrongly prescribed or labelled simply because of the wide variety available, and different classifications of spinal bracing. Correct orthotic spinal prescription is determined by the level of the injury and the type of injury. The type of injury will tell the orthotist which type of brace is required.

### Which type of brace should I wear?

Diagnosis	Disease grouping (classification)	Type of brace
Chronic neck: <i>Strain</i> <i>Sprain</i>	Inflammatory	Soft (soft collar) Semi-rigid (Philadelphia collar)
Herniated lumbar disk	Traumatic/ degenerative	Semi-rigid
Spinal stenosis	Developmental	Rigid
Spondylolisthesis	Traumatic/ degenerative	Rigid
Spondylosis	Traumatic/ degenerative	Soft to semi-rigid
Degenerative disk disease	Traumatic/ degenerative	Rigid
Cervical radiculopathy	Traumatic/ degenerative	Rigid
Sacroiliac (SI) joint pain	Inflammatory	Soft

## Conclusion

While nurses and health professionals in general are exposed to an array of mechanical complications, orthotic intervention can improve symptoms and mobility. However, systemic causes such as diabetes and obesity rely as much on the person himself as on the multidisciplinary health team to control the disease.

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