Spinal Bracing – What is the evidence?

The topic of back supports is controversial. While there are clinicians who insist that the use of a back support or brace results in “weakening of the muscles” or creating a “dependency” on an external support, other clinicians recognize that placing a support on patients often helps them return to full function sooner and avoid the well-documented harmful effects of prolonged immobilization and inactivity. Although there is no hard scientific evidence of the clinical effectiveness of back supports and braces as a group, retrospective studies have documented improvements in symptoms in 30-80% of patients suffering with low back pain.

Spinal braces or supports are classified into one of three distinct categories – corrective, supportive, or immobilizing. Corrective braces are used in the treatment of disorders such as idiopathic scoliosis and kyphosis and will not be discussed in this report. A review of the effects, myths, and indication for spinal braces that provide both support and immobilization is presented.

Effects of Back Supports on the Lumbar Spine

Back Supports Physically Restrict Motion or Movement
The effect of spinal bracing on the movement of the spine has been studied extensively. Norton and Brown showed that lumbar flexion/extension was reduced, but not eliminated. In many cases, motion of the spine was increased towards the upper and lower margins of the braces tested. Wasserman and McNamee contended that fixation of the pelvis was essential to achieving restricted lumbar motion. Attempts, however, to immobilize the pelvis in order to restrict lumbar motion have been shown to be impractical. Therefore, while movement restriction in the thoracolumbar region may be achieved to some degree, external motion limitation in the lumbosacral region may not be possible.

Back Supports Remind the Wearer to Avoid Undesirable Movements
Although back supports have not been shown to be effective in physically immobilizing the lower lumbar spine, they can play a role in encouraging the patient to avoid unwanted movements. The back support serves as a reminder to the individual that certain movements, such as forward bending and twisting, are to be avoided. Many patients report that their back supports help them remember to use good body mechanics. Thus, a properly designed back support, accompanied by proper training and motivation, may help individuals avoid certain movements.

Back Supports Help the Wearer Achieve Proper Posture
One of the greatest benefits of a properly designed back support is the proprioceptive feedback that the support provides. When one is wearing a back support there is an increased awareness of the position of the pelvis and lumbar spine. This constantly reminds individuals of their body positions, making it easier to avoid undesirable postures.

Back Supports Increase Intra-Abdominal Pressure to Decrease the Weight-Bearing Load on the Spine
Morris, Lucas and Bresler showed generalized contraction of the trunk muscles, including the intercostals, the abdominals, and the diaphragm occurs when lifting heavy weights. The upward push on the diaphragm caused by increased intra-abdominal pressure reduced the force on the spine. The study indicated that a back support raised intra-abdominal pressure while sitting and standing by 25%, but showed that abdominal muscles didn’t work as hard when a subject was wearing a back support during heavy lifting. This study suggests that the greatest benefit of a back support might be derived from the relatively constant unloading of the spine during normal activities, rather than during heavy lifting. Nachemson and Morris studied the effects of a back support on intradiscal pressure and concluded that there was a 15-28% decrease in the total load on the disc studied. In another study, Nachemson, Schultz, and Anderson found inconsistent changes in spinal loading in patients wearing a lumbar brace. They did find that lumbar compression forces were reduced by about 1/3 in a task involving trunk flexion. The implication is that while a support may effectively unload the spine during certain activities, the same unloading effect can be naturally achieved through the proper contraction of the abdominal musculature. Since almost all back disorders are the result of cumulative trauma from prolonged sitting or standing, one would conclude that this unloading is of great benefit. Even when individuals are active, they will not be contracting the abdominal muscles constantly. Therefore, a back support can assist the abdominal muscles in their supportive function.

Back Supports Stabilize the Pelvis and Lower Spine
By increasing the intra-abdominal pressure, a back support acts much like the stays and support rings of a barrel. If the support rings are tightened and/or strengthened, a stabilizing effect is achieved. When one tightens or contracts the abdominal, trunk, and pelvic muscles, the spine is stabilized. A properly designed lumbar support, capable of increasing intra-abdominal pressure, acts the same way.

Back Supports Myths
Wearing a Back Support Creates Dependency and Weakenes the Abdominal Muscles
Although the Morris, Lucas, and Bresler study indicate that the use of a back support resulted in a more relaxed state of the abdominal musculature, more current studies demonstrated no evidence of a weakening effect. Back support innovations have, in fact, allowed back pain sufferers earlier return to activity, negating the weakening effects of inactivity.
Back Supports Cause Poor Body Mechanics
A good quality back support encourages proper lifting technique, because slumping or forward bending in bad posture is more difficult. Lifting properly, in turn, strengthens the legs, abdominals and back muscles.

You Should Wean Off a Back Support ASAP
Again, this myth is popular because of the misperception that all back supports are clumsy, rigid and prevent movement. A properly fitted back support actually encourages movement. Many people find that the extra support improves confidence and allows a much earlier return to athletic or work activities. Only when restoration of dynamic core stability has been achieved do we begin weaning the patient from the use of their back support.

Indications for Spinal Bracing
In general, any patient with a musculoskeletal disorder who might benefit from immobilization, unloading of the compressive forces on the spine, or postural correction may be a suitable candidate for spinal bracing. In a study reported in the Journal of Bone and Joint Surgery, Perry found that orthopaedic surgeons were divided concerning indications for the use of spinal bracing. While less than 25% advocated the use of bracing for acute strains, post operative discs, or disc syndromes, the vast majority did utilize bracing for the treatment of postoperative fusions and the treatment of spondylolisthesis.

Given the unloading, stabilizing, and proprioceptive feedback effects of spinal bracing, patients experiencing the following conditions may benefit from spinal bracing:
- Acute sprains and strains
- Post surgical fusion, laminectomy, discectomy
- Congenital or traumatic instability
- Disc herniation
- Spinal stenosis
- Postural backache
- Fractures
- Degenerative joint/disc disease

Interestingly, in a study reported in the Journal of the American Medical Association, the Centers for Disease Control and the National Institute for Occupational Safety and Health found no evidence that back supports reduce back injury or back pain for retail workers who lift or move merchandise. Similarly, no statistically significant difference was found in comparing the incidence of self-reported back pain among workers who reported using back supports every day, with the incidence among workers who reported never using back supports or using them no more than once or twice a month. Neither did the study find a statistically significant difference between the rate of back injury claims among employees in stores that required the use of back supports, and the rate of such claims in stores where back belt use was voluntary. A history of back injury was the strongest risk factor for predicting either a back-injury claim or reported back pain among employees, regardless of back support use.

Except for the treatment of specific compression fractures or particular lytic conditions of the spine, there is no scientific evidence that one brace is superior in providing greater unloading, better stabilization, or more proprioceptive feedback over another brace. Therefore, patient comfort, ease of use, and price should be considered when prescribing a spinal brace.

Conclusion
A well-fitting, comfortable back support can increase patient confidence and encourage early movement, decreasing the negative effects of immobilization and time away from work and/or recreation. Patients may need to be reminded to avoid overdoing activities until full rehabilitation is achieved. The key to success while using back supports is to incorporate their use into a comprehensive spine care program. In conjunction with our active spinal rehabilitation and spinal education programs, your patients will benefit from the latest evidence based for the treatment of spinal dysfunction. We welcome your referrals.

For the latest reviews and updates on back and neck pain, please visit us at www.BackPainReliefSecrets.com

References


