3 LOW BACK PAIN AND CONCEPT OF SEGMENTAL STABILISATION

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Low back pain (LBA) is a universal problem, more common in sedentary subjects, yet not very rare in sportspersons. Common organic causes of LBA in sports persons are intervertebral disc prolapse, facet joint pathology, sacroiliac joint lesions, damage to myofascial structures and metabolic factors. Non-organic causes of LBA are psychosocial, iatrogenic, labels of disability and subsequent prolonged rest, forensic, associated with litigation (Long 1995), behavioural (common in sportspersons), perceived disability with mistaken fear of re-injury (Zusman 1998 and Vlaeyan *et al* 1995), and anticipation of pain: pain perceived in anticipation in the trapezius area instead of lumbar area (Main and Watson 1996). Bending and tortional forces along with axial loading are the most damaging movements.

Proteoglycan Proteoglycan is hydrophilic and comprises 65% of the disc till the age of 30 and declines to 30% by middle age (Bogduk and Towmey 1987). The even distribution of pleasure thus decreases with age.

Spinal stability and low back pain Spinal instability; identifying a specific patho-anatomical cause for LBP is not possible in a majority of cases in sportspersons (Fritz 1998). These patients are often described as having 'mechanical' LBP, researchers and clinicians suggest that segmental instability of the lumbar spine is a possible mechanism underlying LBP in large number of sports persons.

Definitions of segmental instability No one set definition; based on earlier in vitro studies of lumbar spine, the results cited that for segmental instability the following must occur: sagittal-plane translation of one vertebra over the other at least 3 mm on flex/ext radiograph, sagittal-plane rotation of greater than 9° for L1-L5 found that 42% of subjects without LBP had at least one lumbar segment with 3 mm of sagittal-plane translation, and criteria for diagnosing instability increased to 4 mm of translation and 15° for rotation.

Physical signs of instability Step deformity or rotation deformity on standing which reduces on lying, transverse band of spasm which reduces on lying, localised muscle twitching while shifting weight from one leg to the other and shaking during bending forward.

Instability versus hypermobility Hypermobility can lead to instability (Norris 1999). The problem with instability, the excessive movement may either be a stretch or compress pain, sensitive structures leading to inflammation, excessive range of motion without muscle control but loss of stiffness does not mean the loss of pathological condition of stiff back but the physiological condition of decreased resistance against excessive movement.

Stabilising system Panjabi divided the stabilising system into three subsystems: passive, active and neural. Passive subsystem includes vertebral bodies, zygapophyseal joints, and ligaments, injury to the passive system such as intervertebral disk degeneration or disruption of the posterior ligaments of the spine may increase the size of the neutral zone, increasing the demands on the active and neural control subsystems to avoid the development of segmental instability. Active subsystem includes spinal muscles and tendons are important in neutral zone, where passive resistance is minimal. Neural subsystem receives inputs from active and passive subsystems and plays an important role stabilising the spine in anticipation of an applied load. The stabilising muscles of the core have two distinct groups, stabilisers and mobilisers. Stabilisers are deeply placed, aponeurotic, have a slow twitch nature and selectively weaken and lengthen.