

With my sincere gratitude and deepest respect to Geeta Iyengar for her input and corrections on the text.

Slipped Disc

A slipped disc is a misuse of term for a tear in the annular wall of the disc in which the nucleus bulges (other variations include endplate tear and intra discal lesion). Disc protrusion often occurs from a sudden increase of pressure on the disc. If the muscles of the spine are stiff and chronically shortened, this state greatly increases pressure at the disc and therefore the risk of disc injury.

Structure of the Lumbar Spine

The lumbar spine is the portion of spine between the sacrum (pelvis) and thoracic spine (rib cage). It consists of 5 vertebrae - these are the largest vertebrae in the spine and each vertebral body is slightly wedge shaped which accounts for it's inward curve. The joints of the lumbar spine include the apophyseal (or facet) joints which act to align the spine in twisting so the spinal cord is not compressed. Each vertebral body is separated from the one above by a disc formed by a strong outer fibrous walls (formed like tree rings) and a soft inner core. This allows the disc to absorb shock when compressed and keeps the bones apart.

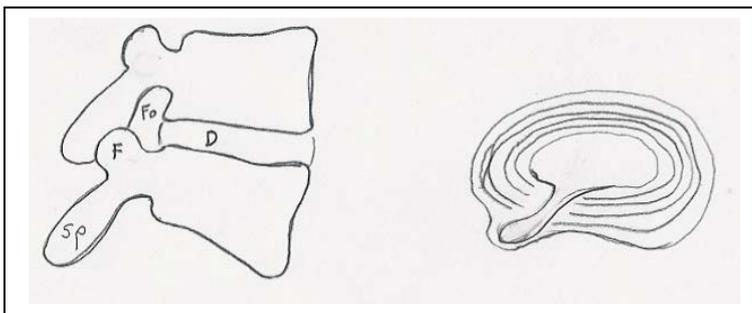


Figure 1

The Vertebrae. F – facet joint, D – disc, Sp – spinous process, Fo – foramen (opening) through which nerve exits.

Disc showing annular rings. The nucleus has broken through the annular fibrous walls and bulges.

On each vertebra are spinous processes or wings on which the large muscles of the pelvis and ribs attach. Consider that the lumbar is the most flexible section of spine it therefore requires strong muscles to support it. These muscles are quadratus Lumborum, psoas, multifidus, erector spinae, rotatores. The diaphragm connects along the upper vertebrae so that spinal alignment affects diaphragmatic tension, and therefore affects the breath. As each vertebrae interlocks with the next it forms an opening on each side from which nerve roots exit. These openings (foramen) when narrowed can exert pressure on the nerves which may cause peripheral nerve pain or muscle weakness including sciatica. Dermatomes map the sensation to its nerve root can be studied to identify which joint is affected (see an atlas of anatomy - for example "Grants").

Along the spine are 2 supporting ligaments - the anterior and posterior ligaments. These run along the front and back of the vertebral bodies and stabilise the structure.

Below I have categorised the spine into 3 principles for discussion

Stable Weight Bearing

Each vertebra is slightly wedge shaped, being larger towards the abdomen. While this creates the curve of the lumbar it still allows the weight of the body to be carried evenly across the complete surface of the vertebra. The spine is in balance / neutral when this is the case. It should be noted however that the fifth or lowest vertebrae sits at such an angle that it creates added force referred to as shear force. For this reason the L4-5 and L5-S1 discs are most vulnerable to damage.

Rotation/ Lateral Twists

When twisting, one set of facet joints open while the opposite set close. Because the spine pivots around the spinal cord twisting exercises the facet joints and the deep muscles of the spine (Rotatores, Multifidus) as well as

the cross hatching (binding) ligaments of the vertebral bodies which surround the disc. Twisting is often referred to in other modalities as contra indicated as it is generally seen as increasing intra disc pressure (like screwing the lid on a jar) – the further you turn the greater the downward force. If twisting can be accompanied with lift as in standing Marichyasana or chair Bharadvajasana, not only is pressure on the disc eased but greater length to muscles and joint freedom ensues.

Flexion / Extension (forward and backward bending)

Forward and backbending are the other movement of the spine. It should be noted that the moment the spine moves out of its centre of gravity there is a marked increase of pressure as spinal weight shifts. Bending forward in a curled position increases pressure at the anterior (front) of the spine as the posterior (rear) muscles stretch and conversely as the spine arches backwards the anterior spine stretches while the spinous processes close. Disc protrusion occurs from a sudden increase in pressure on the disc. For example - a fall down stairs, car accident, lifting or wood chopping. If the muscles of the spine are stiff – this shortened state greatly increases the risk of disc injury. When working yogically caution should be taken to avoid any compression. The spinal muscles are spread to the side. Asana are modified with the use of props. In backbends for example, instead of direct back curvature, the spine is lengthened - Urdhva Mukha Svanasana on stool, Viparita Dandasana- legs elevated and spread.

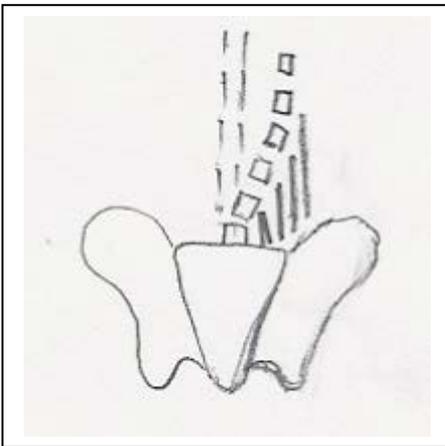
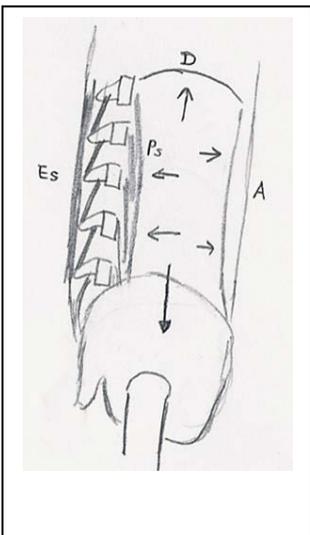


Figure 2.

Acute protective scoliosis may be visible as the adjacent spinal muscles contract usually on the same side as the injury site. This protective mechanism may either appear as spinal scoliosis or a lifting of one crest of the iliac. To relieve acute protective scoliosis Standing poses using belt traction are indicated, or Supta Padanghusthasana cycle with belt traction.

Abdominal Support

Along with the spinal muscles which support the spine posteriorly the abdominal muscles together with the psoas give the spine its stability. The psoas support the anterior spine while the abdominal walls contain the abdominal organs. Weak abdominal support and psoas quickly lead to increased pelvic tilt, pressure changes in the spine, and a greater shear force at L5 – S1 level. However whilst abdominal integrity is essential to support the spine any attempt to strengthen them once the disc is damaged usually results in greater disc pressure and resultant pain.



Once some progress and stability has been made I often introduce Urdhva prasarita padasana with legs supported on the wall laying flat with arms over the head. Emphasis is given to extending the arms and spine whilst straightening the legs without lifting them off the wall, tailbone lengthening to the floor. Even supta Pavanamuktasana helps at this point (lying, knees bent, knees and thighs towards abdomen with blanket between thighs and abdomen) to avoid compression.

Figure 3

The relationship of Erector spinae to Psoas and abdominal muscles provide a balanced structure.

*A – abdominals,
Es – erector spinae,
Ps – psoas,
D - diaphragm.*

Diagnosis

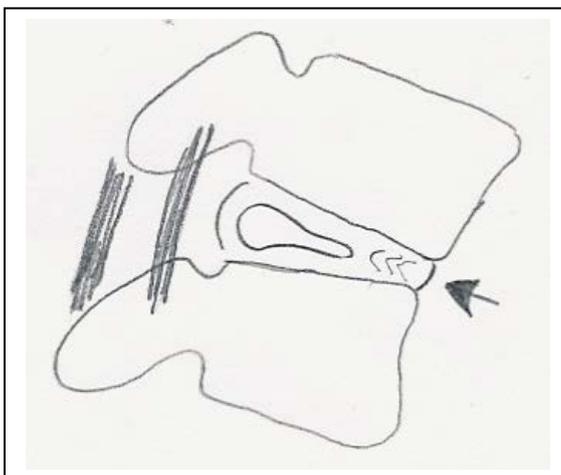
Prolapse of the disc is an extremely painful condition that should be treated with caution. All movements should be slow and deliberate to eliminate the possibility of further damage to the tissue. Other conditions of the back are often mistaken for disc prolapse and so any student should be questioned thoroughly on their assumption of why and how the injury occurred. It should be noted that the injury may involve anything from a tear in the outer annular walls to full herniation of the nucleus so while the general approach may be similar each case should be approached individually. The mobility, flexibility, muscle elasticity will differ from individual to individual. Because of the anterior and posterior ligaments the disc bulges to the side either slightly forward or backwards, hence a "left/ posterior lateral disc prolapse".

Initially the student will experience severe stabbing pain which often leads to incapacitation. Full bed rest is often the outcome. In this period all movement should be undertaken with extreme caution as muscle spasm and inflammation lock the area and any attempt to exercise may result in further damage. At this time even turning over in bed will be painful – bent knee savasana is of great benefit at times like this - lying with knees bent / calves resting on a box or chair with weight on abdomen.

Due to the possible involvement of the nerve roots where they exit the foramen the student should be examined for nerve involvement - dermatomes, nerve pathways, numbness in the limbs, lack of strength or coordination. In disc injury the muscles supporting the spine spasm to limit movement in the joint and local area. The response of the other muscles is to contract causing the structure to pull in on itself thereby intensifying the experience. The sufferer in their heightened awareness is sensitised, often jumpy, fearful and contractive. All movement generates pain and so the student will be fearful in asana of risking further damage. Any treatment requires developing confidence in the exploration of the range of movement available. For example, in a lumbar disc lesion while UrdhvaMukha Svanasana may be possible but if the student arches quickly or to the extreme movement or while fearful the muscle groups will be unable to give enough length and instead of creating space the exact opposite will be the case with resultant experience of pain. For this reason Urdha Mukha Svanasana is often modified with hands raised on a stool. In lifting the hands and shoulders the spine is effectively tractioned, creating space between the vertebral bodies.

Asana Considerations

In the treatment of disc prolapse extreme forward flexion (bending) is usually painful while passive back arches can relieve pressure on the disc. This is due to an increase in the vertebral spacing thus relieving pressure on the disc in the back arch. While this may be the case, if the arch is accompanied by muscular contraction pain will ensue. Figure 4 below shows the forces exerted in bending the spine forward where pressure is exerted on the anterior (front) portion of the disc, this directs pressure backwards. If the disc is herniated the force causes the disc to bulge more. For this reason any forward bending should come from the hips while keeping the spine neutral. Back bends can have a similar result. If the anterior spine doesn't lengthen the increased arch comes from closing (compression) at the rear of the joint for this reason I emphasise tractions and passive extensions



initially with neutral spine to release pressure on the disc before these movements are explored more fully. Examples of passive extension are Pavan Muktanasana and Prasrita Padottanasana with abdominal support on a box. For this reason asanas from group 1 (Asana tractions and releases) at the end of the article are of particular interest. These poses avoid pressure and compression to the disc by creating space. The adjacent muscles are relieved from tension.

Figure 4

As the spine bends forward the pressure increases at the anterior lip which in turn exerts pressure backwards.

Weight bearing asanas will often cause contraction and stabbing pain initially so all introductory movements are done in the prone position assessing left right impairment. Avoid Dhanurasana, Salabhasana since these prone

positions are obvious contractions. Prone Supta Padanghustasana (straight and bent knee) are helpful. The student will be extremely fearful of further damage or pain as both the immediacy and intensity of the sensations are great. For this reason it is common to start in the peripheral muscle groups, commencing in the legs and arms as the muscles in these areas often carry much of the radiating pain and disability. Initially two things happen –

- local muscle groups spasm to immobilise the area around the site
- the adjacent and peripheral muscle groups respond by tightening in a sympathetic contractive response.

By stretching, these peripheral groups the muscles are able to relax which has the effect of relieving the holding in the local muscle groups. In this way the injury can be worked with indirectly without overworking the area in question. The question arises - how much of the muscle spasm is essential and how much is an avoidable "over reaction" in the muscles and mind, including fear. The teacher fulfils an important role at this time as they teach the student how to pace themselves in working with the injury. The following factors apply

- Fear of further injury
- Intolerance. Wanting to be rid of the injury.
- Ambition – overworking.
- Laziness or inability of the student to apply themselves regularly.

While the teacher draws on the groups of asanas they must also show the student how to work with lack of confidence and fear. Without acknowledging these factors there is little chance of success. Short term gains will be followed by relapse.

When the nerve supply is impaired there may be sciatica, radiating pain or numbness in the limbs as well as muscle wasting. This can occur as a result of pressure exerted on the nerve root as it exits the spinal foramen or pressure on the nerve from muscle tension. In the use of asana any increase of nerve reaction ie numbness is an obvious contraindication and treatment in such cases should be either curtailed or modified. However relief is often felt as a result of asana practice as the bulking of the muscle is lessened as the muscle fibre relaxes.

Muscle wasting will accompany impaired nerve pathway and has been noted within a few days of the injury. While rest in the acute (inflamed) phase is indicated it often has a cost of a loss of structural integrity of the area. The sufferer then sits into the joints more. The less time the student is passive the better.

A method of procedure is as follows

- Clearly defined diagnosis if possible to eliminate possibility of tumors etc.
- Assessment of tension in the local area. Noting left /right sensation or pain to one side or limb.
- Assessment of tension in the adjacent muscle groups. Buttock, hamstring, mid thoracic.
- Swelling, inflammation and hardening in the local area.
- Any nerve pain or impairment of the nerve path to peripheral muscle groups. Dermatone pain, muscle weakness.
- Asanas to gently traction the area.
- Commence gentle non weight bearing movement of the limbs to define mobility.
- Asanas to increase mobility.
- Strengthening while maintaining space and minimised intra joint pressure.

Asanas

Given the range of possible injury to the disc there is much debate as to whether the disc can ever be healed fully or to what degree healing can take place but it is important to consider that for the injury to have maximum nutrition and removal of by-products of nutrition and the healing process, a good blood supply is essential. Maintaining this requires movement and keeping load off the area.

Traction can be achieved using back bender, or other mechanical supports or belts in Supta padanghusthasana to limit over rotation of the pelvis and flattening of the lumbar spine. I have also found twisting to be an excellent

movement for the spinal muscles, facet joints etc. While this movement would appear to be compressive if it is done well (ie creating space between the joints) it gives a feeling of relief. Asanas from this group are often modified to be of use, many of the full poses such as Marichyasana 3, Pasasana, Ardha Matsyendrasana are contraindicated.

Below I will list the range of asanas I draw on in the treatment of lumbar disc lesion. Any treatment by its nature must be seen as individual and so must respond to the student and their circumstances. It should be remembered that the use of asana to assist in disc prolapse is being carried out by the student and not as a form of treatment ON them. The student must learn to sensitise themselves to become acutely aware of pressure, tension buildup. They must gradually feel their way out of the area through sensitivity not effort.

Asanas to Traction & Release

Weights on coccyx when lying on front, and weight on pubis when lying on back to help remove tingling nerve sensation and to take pressure off nerve.

Supta Padangusthasana I and II, using rope traction - bolster under thigh when going to side.

Supta Pavanmuktanasana modified with rope traction.

Adho Mukha Svanasana in ropes (hands on chair if necessary).

Ardha Uttanasana. Standing to tall stool, bolster under lower abdomen, right up to groins and lying forward, arms hanging over front of bench.

Supported Prasaritha Padottanasana on box with bolster support along abdomen.

Utthita Hasta Padangusthasana I and II with hanging weight and belt traction on trestler.

Uttanasana hanging over trestler.

Bent knee savasana. Lying with knees bent / calves resting on a box or chair with weight on abdomen.

Mobilising Asanas

Chair Bharadvajasana.

Standing Marichyasana with heel on wedge.

Virasana forwards over bolster, and/or sitting on setu bandha bench lying forward over bolster and someone pulling on rope placed around front at groin level.

Salamba Sarvangasana with knees bent traction over trestler

Ardha Halasana -modified traction over tall halasana box to extend spine. Straight legs, simple cross leg or padmasana are used.

Akunchanasana. Hanging wall rope, knees bent into chest, like Adho Mukha Virasana, rope in groins.

Standing poses with sacral belts, blocks for feet, on trestler.

Supta Baddha Konasana with belt tractions under trestler.

Strengthening Asanas

Standing poses, Trikonasana, Virabhadrasana II, Ardha Chandrasana, usually with one foot up on a brick, back to horse, front foot often turned out. I often commence with virabhadrasana II on the trestler as this works the legs while the spine remains neutral.

Parsvottanasana – emphasis on hip flexion, hands forward on chair.

Utthita Hasta Padangusthasana I and II, sometimes the twist.

Additional Asanas for Consideration

Shoulder openers (on chair).

Gomhukasana series (through dog pose).

Dwi Pada Viparita Dandasana on Back Bender. Feet apart, lifted on bolster - to traction the spine.

Parivrtta Trikonasana and Parivrtta Parsvakonasana modified on trestler.