

Joint illnesses and diseases: causes and treatments



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Herniated Disc

Herniated (slipped) disc happens when all or only a portion of an intervertebral disc is forced through the weak part of the disc thus exerting pressure to the adjacent nerves or spinal cord. Intrinsic degeneration of the intervertebral disc or extrinsic compression of the neural structures in the spinal canal can cause radicular pain. The loss of disc height, which can alter the mechanics of the axial skeleton, may result to disc degeneration. The said changes might produce in other structures such as the zygapophyseal (facet) joints and may result to spinal stenosis. Radicular pain is defined as pain radiating in the distribution of spinal nerve caused by the irritation of the dorsal root ganglion while discogenic pain is an axial pain originating in a degenerative disc. [39] [40] [41] [45]

Considered to be a critical part of the load-bearing structures of the spinal column, the structural component of the intervertebral disc make it capable of changing shape and absorbing shock thus allowing movement. The dysfunction of the intervertebral disc is brought about by multiple factors namely trauma, aging or the degenerative disorders of the spine. [46] The boundary between nucleus and annulus become less evident as a person ages, furthermore as a person grow older the nucleus of the intervertebral disc becomes less gel-like and more fibrotic. Trauma results from activities such as slipping, lifting while in a flexed position, suppressing a sneeze or falling on the buttocks. Degeneration like in osteoarthritis or ankylosing spondylitis predisposes the misalignment of the vertebral column of the client. [46]

A research on the mechanism of intervertebral disc pointed out several pathophysiologic processes. It includes the changes that occur in aging, loss of proteoglycan which is mentioned as the most significant biochemical change that occurs in disc degeneration. It is inferred that the loss of proteoglycan leads to loss of hydration. Another mechanism is the loss of collagen fiber. Unlike with the proteoglycan, the loss of collagen is not that evident. Furthermore, it is deduced that the biochemistry of disc degeneration do not just include increase fragmentation of collagen and proteoglycans but also it includes the increase fragmentation of fibronectin populations. The said mechanisms contribute to the functional changes of the intervertebral disc. [6]

The cervical and lumbar portion of the vertebrae is commonly affected by the dysfunction because it is the most flexible areas of the spine where bending of the vertebral column and support of the mass are greatest. Around 90 to 95% of herniations in the lumbar vertebrae occur in L5 or L₄ to S1 regions respectively. With regards to the herniation at the cervical spine, the most often affected portion is C1 to C7 and C6 to C6. The protrusion usually happens posteriorly toward the intervertebral foramen where the annulus fibrosus is thin and poorly supported by the anterior or posterior ligaments.

Pain is the first and the most usual symptom of herniated disc. The nerve roots namely L4, L5, S1, S2 and S3 give rise to back pain that radiates down back of the leg and over the sole of the foot. Major weakness is rare but slight weakness may occur. Also the most common sensory deficits are paresthesia and numbness, specifically of the leg and foot. There are <https://assignbuster.com/joint-illnesses-and-diseases-causes-and-treatments/>

instances also that knee and ankle reflex may also be absent or decreased.

[46]

Osteoarthritis

Osteoarthritis is a disease in the joints that usually affects middle-age to elderly people. The disease is commonly referred as OA or as the *wear and tear* of the joints although it also involves the cartilage, joint lining, ligaments, and bone. Osteoarthritis is undoubtedly the most usual type of arthritis. [47] Almost 27 million Americans are living with osteoarthritis and almost 1 million people consults medical professional because osteoarthritis.

[47] Perhaps, it is the most cause of disability and pain among elderly people.

[48] [49] Among the risk factor in the development of osteoarthritis are old age and obesity, in fact in the United States it is concluded that by the year 2020, the prevalence of osteoarthritis is already 66 to 100%. [49]

Epidemiologic data shows that age, gender and race interact in the development of osteoarthritis. Men is said to be affected at a younger age compare to women however the prevalence of women affected with osteoarthritis exceeded men by middle age. [50] Heredity influences the occurrence of osteoarthritis. There is a lower prevalence of hip osteoarthritis among Chinese than Europeans, perhaps representing the influence of other factors such as occupation, obesity or heredity. White women will most likely experience hand osteoarthritis on the other hand knee osteoarthritis is more common on black women. [49] In addition, excess fat may have might have a direct metabolic effect on cartilage beyond the effects of excess joint stress; hence weight loss reduces the risk of developing knee arthritis.

The disease is defined as a breakdown of joint cartilage brought about by mechanical stresses or biochemical alteration, resulting to the failure of the bone underneath. Osteoarthritis used to affect various joints in the body which includes hip, knee, first metatarsal pharyngeal joint and, cervical and lumbosacral spine. [47] [48] With regard to hands, the base of the thumb and, the proximal and distal interphalangeal joints are most commonly affected. Osteoarthritis is a joint failure wherein all structures of the joint have undergone structural change which is pathological. [49]

As mentioned earlier, osteoarthritis is popularly known as wear-and-tear arthritis. Osteoarthritis undergoes substantial mechanical and composition change in the properties of cartilage. [48] The first structural change happens in the cartilage followed by the soft tissue. The progressive wear and tear of the cartilage leads into thinning of the surface of the joint and bone ulceration. Later on, inflammation of the joint, increased in the blood flow and hypertrophy of subchondral bone will occur. Consequently, new cartilage and bone will be formed at joint margins resulting to *osteophytosis* or bone spurs which cause alteration in the shape and size of the bone. The primary manifestation of osteoarthritis is a long-standing pain in one or more joints that aggravate with weight bearing or joint use. There is also a presence of morning stiffness usually for 30 minutes and bone deformity (osteophyte) or enlargement of the joint. In some cases there are crepitation and effusion. [51]

Spondylolisthesis

Spondylolisthesis is a bone condition wherein a vertebral body in the spine slips out of the proper position onto the bone below it. It can be associated with spondylosis, infection, lumbosacral junction congenital anomalies, osteoporosis, trauma, tumor, degenerative spine or prior surgery. It is most common to women than men. The slippage of the vertebral body may be asymptomatic or may cause low back pain, hamstring tightness, nerve root injury which is more frequent in L5, or spinal stenosis. The tenderness of spondylolisthesis can be produced near the segment that has slipped forward. There might be a protrusion of the abdomen and shortened trunk because of the extreme forward displacement of L4 on L5. Surgery is usually recommended for patients who are not recovering through rest and physical therapy. [33]

In children spondylolisthesis usually happens between the L5 and S1. It is sometimes because of a birth defect in the spine area or an acute injury in the portion of the spine. In adults, the most often reason behind the development of spondylolisthesis is the abnormal wearing off of the bones and cartilage such as in arthritis. Individuals playing sports such as gymnastics, football and weight lifting is at risk in developing the disease. [52]

Anteroposterior and lateral plain radiographs of the lumbar spine should be obtained in patients complaining of back pain. The lateral view of plain radiograph is useful in identifying spondylolithesis for it can demonstrate the pars interarticularis. Pars interarticularis is the region of junction of the lamina and the pedicle. Incases wherein there is an absence of nerve

involvement, computed tomography (CT) scanning of the lumbar spine provides necessary information with regards to spondylolithesis and its possible cause. CT myelography can give information regarding nerve impingement to patients with radiculopathy. Magnetic Resonance Imaging is advantageous for it protects the patient from being exposed to radiation while imaging is being done. Typically sagittal and axial planes are used. [52]

Fibromyalgia

Fibromyalgia is a poorly understood type of myofascial pain syndrome. Patients with fibromyalgia usually have severe muscle pain and tenderness having specific trigger points, easy fatigability and disturbances in sleep. People with fibromyalgia have “ tender points” such as on neck, shoulders, hips, arms, legs and back. These areas hurt if pressure is exerted to them. In the United States, fibromyalgia has a prevalence rate of 3 to 5 % in females and 0. 5 to 1. 6% in males. Fibromyalgia is the second most common disease that experts in rheumatology encounter with 15% among those who are evaluated. It is also ascertained that around 8% of patients cared in primary care clinics have fibromyalgia. In 2005, the United State spend 10, 199 dollars per patient per year and it has been also estimated that overall, fibromyalgia costs the United State economy over 9 billion dollars every year. [53] With respect to gender, epidemiologic data reveals that fibromyalgia is more common to women than in men with a female-to-male ratio of around 9: 1. Furthermore, it can occur to patients at any age of either sex. It can occur to pediatric patients, especially the adolescents. [54]

The current understanding about fibromyalgia is that it is a disorder of central pain processing or a syndrome of central sensitivity. It is described as a problem with pain threshold. Researchers suggests that patients with fibromyalgia have a lower threshold to pain and other stimuli namely noise, heat and strong odor. It is also believed that neurobiologic changes causes hypersensitivity of patients. These neurobiologic changes are related to psychological factors in that this change affects the person's perception to pain, expectancy or vigilance.

Disturbed sleep has been linked to the pathogenesis of fibromyalgia. Studies have ascertained that awakening unfreshed or nonrestorative sleep has been observed in most of the patients with fibromyalgia. Sleep electroencephalographic studies have shown disruption of normal stage 4 of sleep (non-rapid eye movement). Deprivation in stage 4 sleep has a role in causing fibromyalgia as supported by the observation that symptoms of fibromyalgia developed to normal individuals with disrupted sleep in stage 4. Decreased serotonin metabolites are seen in the cerebrospinal fluid of patients with fibromyalgia. Since serotonin is known to be a neurotransmitter that regulates NREM sleep and pain, it is believed that it might also be involved in the pathogenesis of fibromyalgia. Autonomic dysfunction is also suspected to be involved in the development of fibromyalgia. Individuals with the said disorder were observed to have low levels of cortisol. Low level of urinary free cortisol decreased response to corticotrophin-releasing hormone suggest abnormal hypothalamic-pituitary-adrenal axis. There is also low level of growth hormones. Growth hormone is released during stage 4 or NREM sleep. Many patients have accompanying psychological

abnormalities. Almost 30% of patients fit the diagnostic criteria of anxiety, depression, somatization and hypochondriasis. There is also high prevalence of physical and sexual abuse, and eating disorder. ^[55]

The goal of treatment for patient with fibromyalgia is to relieve pain and other symptoms, and to help a person cope with the said symptoms. It includes: physical therapy, stress relief methods, exercise and fitness program, antidepressants, muscle relaxants and cognitive behavioral therapy.