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Chapter 1 : Chiropractic Care Treatment for Cervical Myofascial Strain

Regardless of its cause (), scoliosis is defined as a lateral curvature of the spine occurring in the coronal racedaydvl.com fact differentiates it from kyphosis, a posterior curvature of the spine in the sagittal plane, and lordosis, an anterior curvature of the spine also in the sagittal plane ().

Ring-like pattern of normal and abnormal bone in ilium Pyknodysostosis Anteroposterior and lateral of long bones Increased density osteosclerosis Resorption of terminal tufts acro-osteolysis Lateral of skull Persistence of anterior and posterior fontanelles Obtuse fetal angle of mandible Osteopoikilosis Dense spots at the articular ends of long bones Osteopathia Striata Dense striations, particularly in metaphysis Progressive Diaphyseal Dysplasia Anteroposterior of long bones particularly lower limbs Symmetric fusiform thickening of cortex Sparing of epiphyses Anteroposterior and lateral of affected bones Asymmetric, wavy hyperostosis like dripping candle wax Ossifications of periarticular soft tissues FIGURE Anteroposterior radiograph of the lower legs of an year-old girl shows pit-like erosions in the proximal tibiae and fibulae arrows , a common finding in this condition. This is commonly seen in the long bones Fig. This type of false joint formation must be differentiated from congenital pseudoarthrosis. Moreover, the long bones are the site of lesions that were once considered to represent intraosseous neurofibromas; these cyst-like radiolucencies are now regarded as lesions representing fibrous cortical defects and nonossifying fibromas, associated with neurofibromatosis see Fig. Whittling of the bones is also a typical feature of neurofibromatosis Fig. The spine is the second most common site of skeletal abnormalities in neurofibromatosis. Scoliosis or kyphoscoliosis, which characteristically involves a short segment of the vertebral column with acute angulation, commonly occurs in the lower cervical or upper thoracic spine. Widening of the intervertebral foramina in the cervical segment may also occur, resulting from dumbbell-shaped neurofibromas arising in spinal nerve roots Fig. In the thoracic and lumbar segments, scalloping of the posterior border of vertebral bodies is another characteristic feature Fig. Although most of these abnormalities can easily be diagnosed with conventional radiography, some ancillary techniques may be useful. Myelography is particularly valuable for demonstrating the increased volume of the enlarged subarachnoid space and the localized dural ectasia extending into the scalloped defects in the vertebral bodies; with the introduction of MRI, this modality became more prevalent in investigation of the aforementioned abnormalities. Lateral radiograph of the right lower leg of an year-old boy with generalized disease demonstrates anterior bowing of the distal tibia and fibula, associated with pseudoarthrosis. Note the pressure erosions in the middle third of the tibial diaphysis. Lateral radiograph of the lower leg and foot of a year-old woman shows whittling of the calcaneus and marked hypertrophy of the soft tissues elephantiasis. Lateral spot-film of the lower thoracic spine in a year-old woman shows scalloping of the posterior border of the T12 vertebra, a common manifestation of this condition. Neurofibromatosis type 2 is autosomal-dominant disorder with a high penetrance caused by mutation of an NF2 gene located on the chromosome 22 22q Type 2 of neurofibromatosis is characterized by multiple schwannomas, meningiomas, and ependymomas. Osteogenesis Imperfecta Osteogenesis imperfecta OI , also known as fragilitas ossium, is a congenital, non-sex-linked, hereditary disorder that manifests in the skeleton as a primary defect in the bone matrix. Depending on the type of OI, the inheritance of the disorder can be autosomal-dominant, autosomal dominant with new mutation, or autosomal recessive. OI congenita Vrolik disease has been classified as the more severe form, which is evident at birth and marked by bowing of the upper and lower extremities in an infant who is either stillborn or does not survive the neonatal period. The more benign OI tarda Ekman-Lobstein disease , in which there is a normal life expectancy, may show fractures present at birth, but these more often appear later in infancy. This condition is also associated with other manifestations, such as deformities of the extremities, blue sclerae, laxity of ligaments, and dental abnormalities. Classification In general, four major clinical features characterize OI: Other clinical features also may be seen, among them ligamentous laxity and hypermobility of joints, short stature, easy bruising, hyperplastic scars, and abnormal temperature regulation. The earlier classification of OI into two types, congenita and tarda, failed to reflect the complexity and heterogenous nature of this disorder. The new classification proposed by Sillence and

colleagues in , and later revised, is based on phenotypic features and the mode of inheritance. Currently, four major types of OI and their subtypes are recognized: Type I This most common type of the disorder is a relatively mild form, with autosomal-dominant inheritance. Bone fragility is mild to moderate and osteoporosis is invariably present. Sclera are distinctly blue and hearing loss or impairment is a common feature. Stature is normal or near normal. Wormian bones are present. The two subtypes are distinguished by the presence of normal teeth subtype IA or dentinogenesis imperfecta subtype IB. Type II This is the fetal or perinatal lethal form of the disorder. This form demonstrates an autosomal-dominant inheritance with new mutation. The very severe nature of generalized osteoporosis, bone fragility, and severe intrauterine growth retardation results in death in the fetal or early perinatal period. All patients in this group have radiologic features typical of OI. In addition, the sclera are blue and the face has a triangle shape caused by soft craniofacial bones and a beaked nose. The calvarium is large relative to the face, and the skull shows a marked lack of mineralization as well as wormian bones. Limbs are short, broad, and angulated. Three subtypes, A, B, and C, are marked by differences in the appearance of the ribs and the long bones. In subtype A, the long bones are broad and crumpled and the ribs are broad, with continuous beading. In subtype B, the long bones also are broad and crumpled, but the ribs show either discontinuous beading or no beading. Subtype C is characterized by thin fractured long bones and ribs that are thin and beaded. Type III This is a severe progressive form and represents a rare autosomal-dominant inheritance with new mutations. Bone fragility and osteopenia are considerable, leading with age to multiple fractures and severe progressive deformity of the long bones and spine. Sclera are normal, although pale blue or gray at birth, but the color changes through infancy and early childhood until it is normal by adolescence or adulthood. The calvarium is large, thin, and poorly ossified; wormian bones are present. Characteristically, osteoporosis, bone fragility, and deformity are present, but they are very mild. Sclera are usually normal. The incidence of hearing impairment is low and is even lower than in type I. Type V includes the patients who originally have been classified as type IV, but had a discrete phenotype including heperplastic callus formation without evidence of mutations in type I collagen, and type VI, that includes the patients who sustained more frequent fractures particularly of the vertebrae than those with type IV, first documented between 4 and 18 months of age. Sclerae of these patients were white or faintly blue, and dentinogenesis imperfecta was uniformly absent. Serum alkaline phosphatase levels were elevated compared with age-matched patients with OI type IV. The type VII is an autosomal recessive form, with moderate to severe phenotype, characterized by fractures at birth, blue sclerae, early deformity of the lower extremities, coxa vara, and osteopenia. Rhizomelia is a prominent clinical feature. This form of OI has been localized to chromosome 3p Lateral radiograph of the leg of a year-old boy with type III disease demonstrates thinning of the cortices and anterior bowing of the tibia and fibula. Note the trumpet-shaped appearance of the tibial metaphysis arrow. Radiologic Evaluation The radiologic features of OI are easily identified on conventional radiographs. Severe osteoporosis, deformities of the bones, and thinning of the cortices are consistently observed features. The bones are also attenuated and gracile, with a trumpet-shaped appearance to the metaphysis Fig. Other typical skeletal abnormalities are seen in the skull, where wormian bones are a recognizable feature Fig. In children with a severe degree of disorder, the metaphyses and epiphyses of the long bones may exhibit numerous scalloped radiolucent areas with sclerotic margins Fig. The pelvis is invariably deformed, and acetabular protrusio is a common finding Fig. Only gold members can continue reading. Log In or Register to continue Share this:

Chapter 2 : What are vertebrae and what is their function

Thoracic vertebrae: The thoracic vertebrae are irregular bones which envelop, support and protect the spinal cord and make up the spinal column of the mid to upper back. There are 12 thoracic vertebrae that also help to support and give structure to the back and allow for movement of the back by.

Each thoracic vertebra is named for its position within the spine, from the first thoracic vertebra T1 on the superior end to the twelfth thoracic vertebra T12 on the inferior end. The spinal column formed by the thoracic vertebrae protrudes posteriorly to form the convex thoracic curve of the spine. The thoracic vertebrae are medium in size â€" larger and thicker than the cervical vertebrae above them, but smaller and thinner than the lumbar vertebrae below. The T1 vertebra is the smallest and closely resembles the cervical vertebrae, while the T12 vertebra is the largest and most similar to the lumbar vertebrae. The intermediate vertebrae all follow the trend of increasing size from superior to inferior as a result of the greater body weight supported by the inferior vertebrae. The bulk of the bony mass of the thoracic vertebrae is located within a cylindrical region known as the vertebral body or centrum. Each thoracic vertebra supports a pair of ribs and contains a pair of smooth, concave joint-forming processes known as facets on its sides. The ribs are anchored to the spine by the planar joints formed between the vertebrae and the ribs. The first nine thoracic vertebrae T1 through T9 contain a pair of demi-facets, where a facet is split between two adjacent vertebral bodies. Meanwhile, the first, tenth, eleventh, and twelfth T1, T10, T11 and T12 vertebrae all contain a pair of full facets on their vertebral bodies to support ribs. T1 is unique among all thoracic vertebrae in supporting two pairs of ribs through a pair of facets and a pair of demi-facets. Between the vertebral bodies of the thoracic vertebrae are the tough, rubbery intervertebral disks. Each disk is made of an outer shell of fibrocartilage known as the annulus fibrosus, which holds the vertebrae in place while providing a small range of motion between them. Inside the annulus fibrosus is the gel-like nucleus pulposus that acts as a soft shock absorber to prevent collisions between the vertebrae. Posterior to the vertebral bodies are thin bony rings known as the vertebral arches. Each vertebral arch surrounds and protects a hollow vertebral foramen that provides space for the spinal cord and spinal nerves. A pair of transverse processes extends from the lateral sides of each vertebral arch to support the ribs and provide attachment sites for the rotatores and multifidus muscles of the back. At the posterior end of the vertebral arch, each thoracic vertebra extends posteriorly and inferiorly to form the spinous processes. Each spinous process supports several muscles of the back to provide movement to the trunk and spine region. The spinous processes also overlap each other slightly to provide extra support and rigidity to the thoracic region and prevent extraneous movements. Two pairs of articular processes extend superiorly and inferiorly toward the neighboring vertebrae, in order to help stabilize the spine and connect the thoracic vertebrae to one another and to the C7 and L1 vertebrae. Flat planar joints form between the articular processes of these neighboring vertebrae, allowing the bones to move independently while maintaining the strength and stability of the spinal column. The superior articular processes end in smooth surfaces facing posteriorly to meet the articular process of the vertebra above. On the inferior end, the inferior articular processes end in smooth, flat surfaces facing anteriorly to meet the next vertebra. The T1 and T12 vertebrae are the exceptions to this rule; T1 features a superior articular process resembling those of the cervical vertebrae, while the inferior articular process of T12 resembles those of the lumbar vertebrae.

Chapter 3 : Rothman-Simeone and Herkowitz's The Spine, 2 Vol Set. Edition No - KXXV Central Texas Ne

Bilateral pars interarticularis defect with anterior migration of one vertebrae body on another. In the skeletal immature athlete. Pain, deformity and neurological deficits.

The notochord, which constitutes the earliest structure that stiffens the embryo, appeared in animals before the true vertebral column evolved. A vertebra includes a centrum and a neural arch surrounding the spinal cord. Each vertebra , in higher vertebrates, consists of a ventral body, or centrum, surmounted by a Y-shaped neural arch. The arch extends a spinous process projection downward and backward that may be felt as a series of bumps down the back, and two transverse processes, one to either side, which provide attachment for muscles and ligaments. Together the centrum and neural arch surround an opening, the vertebral foramen, through which the spinal cord passes. The centrums are separated by cartilaginous intervertebral disks, which help cushion shock in locomotion. Vertebrae in lower vertebrates are more complex, and the relationships of their parts to those of higher animals are often unclear. In primitive chordates e. The notochord appears in the embryos of all vertebrates in the space later occupied by the vertebral bodiesâ€”in some fish it remains throughout life, surrounded by spool-shaped centrums; in other vertebrates it is lost in the developed animal. In primitive chordates the spinal cord is protected dorsally by segmented cartilagesâ€”these foreshadow the development of the neural arch of true vertebrae. Fish have trunk and caudal tail vertebrae; in land vertebrates with legs, the vertebral column becomes further subdivided into regions in which the vertebrae have different shapes and functions. Crocodilians and lizards, birds, and mammals demonstrate five regions: The atlas and axis vertebrae, the top two cervicals, form a freely movable joint with the skull. The numbers of vertebrae in each region and in total vary with the species. Snakes have the greatest number, all very similar in type. In turtles some vertebrae may be fused to the shell carapace ; in birds all but the cervical vertebrae are usually fused into a rigid structure, which lends support in flight. Most mammals have seven cervical vertebrae; size rather than number account for the variations in neck length in different species. Whales show several specializationsâ€”the cervical vertebrae may be either much reduced or much increased in number, and the sacrum is missing. Humans have 7 cervical, 12 thoracic, 5 lumbar, 5 fused sacral, and 3 to 5 fused caudal vertebrae together called the coccyx. The vertebral column is characterized by a variable number of curves. In quadrupeds the column is curved in a single arc the highest portion occurring at the middle of the back , which functions somewhat like a bow spring in locomotion. In humans this primary curve is modified by three more: The lumbar curve is a permanent characteristic only of humans and their bipedal forebears, though a temporary lumbar curve appears in other primates in the sitting position. The cervical curve disappears in humans when the head is bent forward but appears in other animals as the head is raised. Learn More in these related Britannica articles:

Chapter 4 : Scoliosis and Anomalies with General Affliction of the Skeleton | Radiology Key

It is protected by your vertebrae, which are the bone disks that make up your spine. If you have an accident that damages the vertebrae or other parts of the spine, this can also injure the spinal cord.

Disease[edit] Spina bifida is a congenital disorder in which there is a defective closure of the vertebral arch. Sometimes the spinal meninges and also the spinal cord can protrude through this, and this is called Spina bifida cystica. Where the condition does not involve this protrusion it is known as Spina bifida occulta. Sometimes all of the vertebral arches may remain incomplete. Spondylolisthesis is the forward displacement of a vertebra and retrolisthesis is a posterior displacement of one vertebral body with respect to the adjacent vertebra to a degree less than a dislocation. Spinal disc herniation , more commonly called a "slipped disc", is the result of a tear in the outer ring anulus fibrosus of the intervertebral disc , which lets some of the soft gel-like material, the nucleus pulposus , bulge out in a hernia. Spinal stenosis is a narrowing of the spinal canal which can occur in any region of the spine though less commonly in the thoracic region. The stenosis can constrict the spinal canal giving rise to a neurological deficit. Pain at the coccyx tailbone is known as coccydynia. Curvature[edit] Excessive or abnormal spinal curvature is classed as a spinal disease or dorsopathy and includes the following abnormal curvatures: Kyphosis is an exaggerated kyphotic concave curvature in the thoracic region, also called hyperkyphosis. Lordosis as an exaggerated lordotic convex curvature of the lumbar region, is known as lumbar hyperlordosis and also as "swayback". Temporary lordosis is common during pregnancy. Scoliosis , lateral curvature, is the most common abnormal curvature, occurring in 0. It is more common among females and may result from unequal growth of the two sides of one or more vertebrae, so that they do not fuse properly. It can also be caused by pulmonary atelectasis partial or complete deflation of one or more lobes of the lungs as observed in asthma or pneumothorax. Kyphoscoliosis , a combination of kyphosis and scoliosis. Anatomical landmarks[edit] Surface projections of organs of the torso. The transpyloric line is seen at L1 Individual vertebrae of the human vertebral column can be felt and used as surface anatomy , with reference points are taken from the middle of the vertebral body. This provides anatomical landmarks that can be used to guide procedures such as a lumbar puncture and also as vertical reference points to describe the locations of other parts of human anatomy, such as the positions of organs. Other animals[edit] Variations in vertebrae[edit] The general structure of vertebrae in other animals is largely the same as in humans. An arch extending from the top of the centrum is called a neural arch, while the haemal arch or chevron is found underneath the centrum in the caudal tail vertebrae of fish , most reptiles , some birds, some dinosaurs and some mammals with long tails. The vertebral processes can either give the structure rigidity, help them articulate with ribs, or serve as muscle attachment points. Common types are transverse process, diapophyses, parapophyses, and zygapophyses both the cranial zygapophyses and the caudal zygapophyses. The centrum of the vertebra can be classified based on the fusion of its elements. In temnospondyls , bones such as the spinous process , the pleurocentrum and the intercentrum are separate ossifications. Fused elements, however, classify a vertebra as having holospondyly. A vertebra can also be described in terms of the shape of the ends of the centrum. Centra with flat ends are acoelous, like those in mammals. These flat ends of the centra are especially good at supporting and distributing compressive forces. Amphicoelous vertebra have centra with both ends concave. This shape is common in fish, where most motion is limited. Amphicoelous centra often are integrated with a full notochord. Procoelous vertebrae are anteriorly concave and posteriorly convex. They are found in frogs and modern reptiles. Opisthocoelous vertebrae are the opposite, possessing anterior convexity and posterior concavity. They are found in salamanders, and in some non-avian dinosaurs. Heterocoelous vertebrae have saddle -shaped articular surfaces. This type of configuration is seen in turtles that retract their necks, and birds, because it permits extensive lateral and vertical flexion motion without stretching the nerve cord too extensively or wringing it about its long axis. In horses, the Arabian breed can have one less vertebrae and pair of ribs. This anomaly disappears in foals that are the product of an Arabian and another breed of horse. Cervical vertebrae are those in the neck area. With the exception of the two sloth genera Choloepus and Bradypus and the manatee genus, Trichechus , [13] all

mammals have seven cervical vertebrae. The dorsal vertebrae range from the bottom of the neck to the top of the pelvis. Dorsal vertebrae attached to the ribs are called thoracic vertebrae, while those without ribs are called lumbar vertebrae. The sacral vertebrae are those in the pelvic region, and range from one in amphibians, to two in most birds and modern reptiles, or up to three to five in mammals. When multiple sacral vertebrae are fused into a single structure, it is called the sacrum. The synsacrum is a similar fused structure found in birds that is composed of the sacral, lumbar, and some of the thoracic and caudal vertebra, as well as the pelvic girdle. Caudal vertebrae compose the tail, and the final few can be fused into the pygostyle in birds, or into the coccygeal or tail bone in chimpanzees and humans. Fish and amphibians[edit] See also: The vertebral arch surrounds the spinal cord, and is of broadly similar form to that found in most other vertebrates. Just beneath the arch lies a small plate-like pleurocentrum, which protects the upper surface of the notochord , and below that, a larger arch-shaped intercentrum to protect the lower border. Both of these structures are embedded within a single cylindrical mass of cartilage. A similar arrangement was found in the primitive Labyrinthodonts , but in the evolutionary line that led to reptiles and hence, also to mammals and birds , the intercentrum became partially or wholly replaced by an enlarged pleurocentrum, which in turn became the bony vertebral body. In living amphibians , there is simply a cylindrical piece of bone below the vertebral arch, with no trace of the separate elements present in the early tetrapods. The upper tube is formed from the vertebral arches, but also includes additional cartilaginous structures filling in the gaps between the vertebrae, and so enclosing the spinal cord in an essentially continuous sheath. The lower tube surrounds the notochord, and has a complex structure, often including multiple layers of calcification. Even the arches are discontinuous, consisting of separate pieces of arch-shaped cartilage around the spinal cord in most parts of the body, changing to long strips of cartilage above and below in the tail region. Hagfishes lack a true vertebral column, and are therefore not properly considered vertebrates, but a few tiny neural arches are present in the tail. The shape of the vertebral body does, however, vary somewhat between different groups. In mammals, such as humans, it typically has flat upper and lower surfaces, while in reptiles the anterior surface commonly has a concave socket into which the expanded convex face of the next vertebral body fits. Even these patterns are only generalisations, however, and there may be variation in form of the vertebrae along the length of the spine even within a single species. Some unusual variations include the saddle-shaped sockets between the cervical vertebrae of birds and the presence of a narrow hollow canal running down the centre of the vertebral bodies of geckos and tuataras , containing a remnant of the notochord. In the tail, these are attached to chevron-shaped bones called haemal arches, which attach below the base of the spine, and help to support the musculature. These latter bones are probably homologous with the ventral ribs of fish. The number of vertebrae in the spines of reptiles is highly variable, and may be several hundred in some species of snake. The thoracic vertebrae are partially fused, providing a solid brace for the wings during flight. The sacral vertebrae are fused with the lumbar vertebrae, and some thoracic and caudal vertebrae, to form a single structure, the synsacrum, which is thus of greater relative length than the sacrum of mammals. In living birds, the remaining caudal vertebrae are fused into a further bone, the pygostyle , for attachment of the tail feathers. There are almost always seven cervical vertebrae sloths and manatees are among the few exceptions , followed by around twenty or so further vertebrae, divided between the thoracic and lumbar forms, depending on the number of ribs. There are generally three to five vertebrae with the sacrum, and anything up to fifty caudal vertebrae. Saurischian dinosaur vertebrae sometimes possess features known as pleurocoels, which are hollow depressions on the lateral portions of the vertebrae, perforated to create an entrance into the air chambers within the vertebrae, which served to decrease the weight of these bones without sacrificing strength. These pleurocoels were filled with air sacs, which would have further decreased weight. In many hadrosaur and theropod dinosaurs, the caudal vertebrae were reinforced by ossified tendons. The presence of three or more sacral vertebrae, in association with the hip bones, is one of the defining characteristics of dinosaurs.

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Section 12 Afflictions of the Vertebrae. Arthritis Disorders. Surgical Management of Rheumatoid Arthritis. Ankylosing

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Spondylitis. Tumors of the Spine. Infections of the Spine.

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Spine fractures caused by trauma â€" such as a sudden blow or injury to the vertebrae â€" can occur anywhere on the spine, including bones in the neck or cervical spine, bones in the upper back or thoracic spine, the lower back or lumbar spine, and the section of connected bone at the very bottom of the spinal column called the sacrum.

Chapter 7 : What Are Spine Tumors? â€“ Neurosurgeon News

The lumbar spine lies below the thoracic spine (chest) and above the sacrum. It consists of five movable vertebrae numbered L1 through L5, linked by a complex array of discs, joint capsules, ligaments/tendons, and large muscles.

Chapter 8 : Vertebrae | Definition and Function

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Chapter 9 : Vertebral column | anatomy | racedaydvl.com

Vertebral column, also called spinal column, spine, or backbone, in vertebrate animals, the flexible column extending from neck to tail, made of a series of bones, the vertebrae. The major function of the vertebral column is protection of the spinal cord; it also provides stiffening for the body and attachment for the pectoral and pelvic.