
Diseases And Disorders In The Axial Skeleton

The skeletal system can be broken down into two components, called the axial skeleton and the appendicular skeleton. The axial skeleton is a part of the skeleton that includes the bones of the top and trunk of the vertebrate. The axial portion consists of 80 bones and is composed of six elements which are the cranium (22 bones), the ossicles of the center ear, the hyoid bone, the thoracic cage, and the vertebral column. In the appendicular skeleton, it has a total of 126 bones and includes the bones that make up the arms and legs, in addition to the bones that connect them to the axial skeleton (Martini, Nath, & Bartholomew, 2018, p. 209). In this paper, I will be focusing on the axial skeleton portion of the body, and the causes of some of the disorders and diseases that are found in the axial skeleton. When researching, the most fascinating disorders found during my research were craniosynostosis, fibrous dysplasia, osteomas, which are inhabited in the skull, as well as the diseases kyphosis, lordosis, scoliosis found in the vertebral column.

Literature Review

Skull Diseases and Disorders

To start with the skull, a disorder that I found that was interesting was craniosynostosis. Craniosynostosis is a common condition that occurs with infants, which may be in relation to craniofacial syndrome, that refers to abnormality with the head or facial features (Khanna, Thapa, Iyer, & Prasad, 2011). It is the “premature fusion of cranial sutures” that usually alter the shape of the cranial vault, or the space that surrounds and protects the brain along with the base of the skull (Khanna, Thapa, Iyer, & Prasad, 2011). Craniosynostosis, is categorized by the amount of sutures present. “Simple craniosynostosis” has only has one suture and “Compound craniosynostosis” that has two or more sutures (Khanna, Thapa, Iyer, & Prasad, 2011). Primary craniosynostosis can arise spontaneously or genetically, and when genetically passed down it usually “manifests as a component of the various craniofacial syndromes and may result from one of several genetic mutations” (Khanna, Thapa, Iyer, & Prasad, 2011). Secondary craniosynostosis is from an underlying disorder, which relates to “systemic and metabolic conditions” as well as conditions that halt the growth at the sutures (Khanna, Thapa, Iyer, & Prasad, 2011).

The rare bone disorder fibrous dysplasia is found most commonly in the facial bones and the skull, pelvic bones, thigh, ribs, shin, and upper arm bone. It is a disturbance of bone metabolism and is classified as a benign fibro osseous lesion in which the fibrous connective tissue containing atypical bone replaces ordinary bone (Shreedhar, Kamboj, Kumar, & Khan, 2012). This disorder can affect a monostotic form (one bone), or a polyostotic form (multiple bones). Monostotic form is more common than a polyostotic one and is prone to affect ages 20-30 years old, while the polyostotic form is more effective towards children who are younger than ten (Shreedhar, Kamboj, Kumar, & Khan, 2012). The disorder causes “bone pain, deformities, and pathological fractures” along with swelling (Shreedhar, Kamboj, Kumar, & Khan, 2012). Fibrous dysplasia is similar to craniosynostosis as both disorders have no exact cause. The accepted theory is that disorders are inherited, but fibrous dysplasia is not known to be genetically passed down (Shreedhar, Kamboj, Kumar, & Khan, 2012). The bone tumors, osteomas are non-

cancerous bone tumors with a prolonged growing process and are usually found in young adult males (Kakkar et al, 2016). The tumors are typically found “in the craniofacial region, particularly in the paranasal sinuses and the jaw bones, and rarely affect the skull bones” (Shreedhar, Kamboj, Kumar, & Khan, 2012). Cranial osteomas are recommended to be classified by the following: 1. skull base osteomas, 2. skull vault osteomas, 3. dural osteomas, and 4. intraparenchymal osteomas, along with skull base osteomas being one of the most common among the latter groups (Kakkar et al, 2016). Tumors are normally removed by means of surgery, and there must be immediate removal of sphenoid osteomas that will lead to blindness due to growth and compression of the optic apparatus (Kakkar et al, 2016). An osteoma occurs when certain cells divide uncontrollably, forming a small mass of bone and different tissue. This growing tumor replaces healthy bone tissue with unusual, hard bone tissue and like the other two diseases and disorders, it is yet to be discovered why it happens (Kakkar et al, 2016).

Vertebral Column Diseases and Disorders

Disorders of the bones of the vertebral column include kyphosis, lordosis, and scoliosis. Kyphosis is an unusual posterior enhancement of the thoracic cage, producing a hump back silhouette (Martini, Nath, & Bartholomew, 2018, p. 236). It is possible for Kyphosis to develop because of trauma, developmental anomalies, degenerative disc disease, inflammatory diseases, and infectious diseases as well as iatrogenic, which relates to a sickness caused by examination or treatment (Yaman & Dalbayrak, 2014). There are three major causes for this disorder; “1. osteoporosis with compression fractures affecting the anterior portions of vertebral bodies 2. chronic contractions in muscles that insert in the vertebrae or 3. abnormal vertebral growth” (Martini, Nath, & Bartholomew, 2018, p. 236). The condition lordosis is simply when both the abdomen and buttocks protrude atypically, giving the body a bending backward appearance (Martini, Nath, & Bartholomew, 2018, p. 236). To many health websites, lordosis can be caused by many factors or conditions, such as spondylolisthesis, which is a spinal condition in which one of the lower vertebrae dips forward onto the bone below; and is commonly handled with therapy or a surgical procedure. The last of the spinal deformities is the most common spinal abnormalities, scoliosis. Scoliosis is a sideways curvature that takes place in the spine, and can be resulted from “damage to vertebral bodies during development or muscular paralysis affecting one side of the back” (Martini, Nath, & Bartholomew, 2018, p. 236). Scoliosis can be the product of neurological conditions (like cerebral palsy or paralysis), muscular abnormalities or other syndromes such as Marfan syndrome and neurofibromatosis (Janicki & Alman, 2007). In some occasions, significant lateral deviation of the spine can happen with little to no rotation of the spine and bony abnormalities (Janicki & Alman, 2007). In these cases, scoliosis can result in a lot of pain, spinal cord abnormalities, tumors and infection (Janicki & Alman, 2007). In some cases, the cause of scoliosis is unknown, but a logical theory is that it commonly occurs with adolescent girls during their growth spurts (Martini, Nath, & Bartholomew, 2018, pg 236). Small curves can actually become stable once fully developed, but for larger curves a brace can cause limited progression and severe cases need treatment through surgically implanted rods (Martini, Nath, & Bartholomew, 2018, p. 236).

Summary

The axial skeleton is a part of the skeleton that consists of the bones of the top and trunk of the vertebrate. The three researched diseases and disorders in this literature review are

craniosynostosis, fibrous dysplasia, and osteomas and those in the vertebral column are kyphosis, lordosis, and scoliosis. Craniosynostosis is a common condition that occurs with infants, which can also relate to craniofacial syndrome, that refers to abnormality with the head or facial features and is the “premature fusion of cranial sutures” that usually alter the shape of the cranial vault, or the space that surrounds and protects the brain along with the base of the skull. Fibrous dysplasia is a disturbance of bone metabolism and is classified as a benign fibro osseous lesion in which the fibrous connective tissue containing atypical bone replaces ordinary bone. Osteomas are non-cancerous bone tumors with a prolonged growing process and are usually found in young adult males. Kyphosis is an unusual posterior enhancement of the thoracic cage, producing a hump back silhouette. Lordosis is when both the abdomen and buttocks protrude atypically, giving the body a bending backward appearance. Lastly, scoliosis is a sideways curvature that takes place in the spine, and can be resulted from “damage to vertebral bodies during development or muscular paralysis affecting one side of the back”.