

<u>Thoracic</u>

Fig [4]

The thoracic region (rib cage) is a 'cage' of rib bones bonding between the T1-T12 of the spine and the sternum which is at the front centre of the chest. These ribs perform a variety of functions, such as that of protecting vital organs such as the heart, lungs and thymus gland. Having cartilage bonding between the ribs and sternum, as well as the bowed shape of the ribs, the cage itself can withstand a reasonable amount of force and flexion as well as absorbing shock. [15]

Appendicular Skeleton



Fig [5] The appendicular ske on is consistent with he bones of the tion struct derive from the axial skeleton (as shown in the areas hlighted in purple above). The belles in these areas are less protective and more for the enablement of movement through joints. However, they also produce a large percentage (the femur particularly) of the blood within the body, and of course, they also provide support for the weight of the body due to high compressive strength.

Additionally, the bones of the hands and feet are also part of the appendicular skeletal structure. These consist of many small bones such as the tarsals and metatarsals, carpals, metacarpals and phalanges. These then use a combination of gliding, hinge, and saddle joints for grip and support in combination with consolidated joints of the wrists and ankles for flexibility and a wide range of motion. A further depth of this can be seen below. [15]

• Condyloid Joints

An example of the condyloid joint is that of the wrist. It is built up of several small bones and ligaments, these include the lunate, capitate, scaphoid, trapezium, trapezoid, pisiform, triquetral, and humate bones and their associated ligaments.

The construction of a condyloid joint allows for the movement of two planes, with flexion and extension, as well as adduction, abduction and circumduction. This movement is controlled via the tendons of the forearm and hand connecting the muscles in between. It allows humans to rotate the wrist and lay it at an almost 90-degree angle to the forearm towards the radius. This is the result due to the full convex shape at one end of the bone fitting into a fully concave shape at the end of the adjoining bone. [6] [15]

Slow and Fast Twitch Muscles

Human skeletal muscles consist of slow and fast twitch muscles. The proportion of these varies for different people, such as marathon runners having a lot of slow twitch muscles, while sprinters having a large proportion of fast twitch muscles.

Slow twitch (type 1) are red in colour, and have large volumes of myoglabit Gtoring large amounts of oxygen and mitochondria. As a result, they are very restant to fatigue, they are often postural muscles such as in the neck and spine dic to heir high endurance. They also contain less sarcoplasmic reticulum and have a tense network encapillaries.

On the other hand, fast which (type 2A), is a hybrid of type one and two. They manufacture and split ATP at a perturbed by utilising both probic and anaerobic metabolism and many capillaries, and some) produce fast, strong nuscer contractions, although they are prone to fatigue (more so than type 1). Additionally, fast twitch (type 2B) are white in colour, with a low level of myoglobin and few mitochondria and capillaries. They slowly produce ATP via anaerobic respiration but break it down very quickly. They have a large store of glycogen and specialise in short, fast bursts of power, but they fatigue rapidly. These can be converted to type 2a with resistance training and they are primarily found in large quantities in the arms, in comparison to the others, they are the largest muscles by volume. [15]

a hill or stairs. This can occasionally cause the knees to buckle and 'give way', feeling limp and causing difficulties in straightening the knee. It is also not uncommon to hear the aforementioned grating or clicking sound when moving the joint.

Osteoarthritis of the hips

In the hips, osteoarthritis can often cause great difficulty in movement, such as in walking, getting in and out of the car and putting on footwear. These regular activities can often become difficult and cause a great deal of pain. This can also often lead to pain in the groin area or the outside of the hip, as well as potentially causing pain when trying to rest and sleep. Being a ball and socket joint, there is often a lot of movement involved in simple actions and any bony spurs (osteophytes) that have developed can cause a great deal of pain, as well as the degradation of cartilage in the joint causing a lot of friction between the convex and concave surfaces of the joint.

Osteoarthritis of the hand

In the hand, this form of arthritis commonly affects the basal carpometacarpal and the interphalangeal. The affected joints can become swollen and painful, often with limited movement as the carpal tunnel ligaments of the forearm are unable to flex due to the bone spurs between the gliding joints of the palm. Patients may experience noticeably tangible bumps are unable. Over a period, the pain may decrease und cease to cause much effect to entropy. However, the problem could remain others are bumps and that of movement in the junts.

Affected joints can potentially move sideways as a result of the condition and even develop painful cysts on the back of the hand near the afflicted joint as synovial fluid builds up and causes swelling. Fig [9]

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In some cases, sufferers develop a painful lump around the Scaphotrapeziotrapezoidal (STT) joint at the base of the thumb. This can make tasks such as opening doors and turning keys difficult and very painful.

Treatment of Osteoarthritis

Currently, there is no cure for osteoarthritis. However, there are several treatments which can aid with the pains and symptoms of the disorder, and there is no guarantee that it will get any worse over time.

Transcutaneous electrical nerve stimulation •

This treatment works through the application of electrodes to areas such as the span through sticky patches. An electrical current is then sent through the body in order to numb the nerve endings of the spine, this then decreases the level of pain as impulses can't be sent to the brain. This is often organised by a patient's physiotherapist, who is capable of advising upon the strength and duration of treatment for various levels of pain.

Thermotherapy

Thermotherapy is a form of treatment with the use of either hot or cold packs, this is a minimal and simple treatment which can easily be done in the home. But in some patients, it can make a difference in the pain felt in their joints and as a result, it may often be recommended by GP's as a simple form of self-treatment, especially when patients are, only just beginning to feel the pains.

Manual Therapy

When saying 'manual', this refers to the use of home exercises and stretching which are designed by physiotherapists and thought to patients in order to prevent joint from string up and further degrading the cartilage through lack of use. The various exercises also promote weight loss, which is beneficial to patients in order to reduce the stresses they put upon their from Notes joints.

Surgery

i a small number of cross in the condition and takes place either if Surgery is only necessary the treatments provided to patients how open ineffective or if the afflicted joint is severely damaged. Surgery can often provenigely effective after being operated on by a specialist orthopaedic surgeon, and it can extensively improve the quality of life and relinquish sufferers from their pain.

However, surgery is not always successful and may not fully remove the pains felt, and patients may still feel stiffness and pains for the remainder of their life in some cases.

As listed below, there are several forms of surgery that can take place: Forms of surgery

Arthroplasty

This is the technical name for joint replacement therapy, it is commonplace for the knees and hips as these are heavy weight-bearing joints and therefore are often where osteoarthritis can develop. As a result, damaged joints can rarely be recovered fully, and therefore surgeons completed remove the joint and replace it with an artificial joint (a prosthesis). These are typically made of specific metals and plastics which rarely get attacked by the immune system and are usually accepted by the body. On average, these prostheses last about 20 years, and as a result, they usually need to be replaced in younger patients. However, amongst the number Edition: 2, Reviewed: December 2015, Planned date of Review: December 2018, Date of Issue: Jan 2016

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