

Muscles & Bones in Action

37 pages

ALSO AVAILABLE AS A POWER
POINT PRESENTATION



Introduction

To help understand the anatomical aspects of human movement in a stimulating way, with the notes being complemented by high quality full coloured illustrations.

BLUE LINKS BY EACH ILLUSTRATION TAKE YOU TO THE FULL COLOUR VERSION

The Skeletal System 4	
Types of Bones	5
The Muscular System	6
Muscle Arrangements	9
Types of Muscle Action	10
Types of Joint	11
Major Muscles of the Trunk	12
Abduction and Adduction of the Arms	13
Major Muscles of the Arms	14
Major Muscles of the Legs	15
Abduction, Adduction, Flexion & Rotation of the Upper Legs	16
Pronation, Supination, Dorsi-flexion & Plantar-flexion of the Foot	17
Major Muscles in Action	18
Table of Major Muscles and their Action	19
Bones as Levers	20
Movement in Relation to the Major Body Planes & Axes	21
Posture	22
Antagonistic Balance	23
Appendix: Full colour illustrations	26

The Skeletal System

Bone growth Before birth, the skeleton is made up of cartilage, which is much softer and more flexible than bone. After birth, the cartilage of the skeleton is gradually replaced by bone in a process of ossification. While the main structure of the 'bones' still contains cartilage growth regions, they can continue to grow in length. However, once this cartilage has been replaced by ossification, the bones cannot grow in length any more. The closure of the cartilaginous growth regions in the long bones marks the end of growth in height of the individual. Bones can continue to grow in girth however, and do so when exposed to some continuing stress. Bone is largely composed of collagen fibres, the same as are found in tendons, and is hardened only by the deposition of calcium compounds eg calcium phosphate.

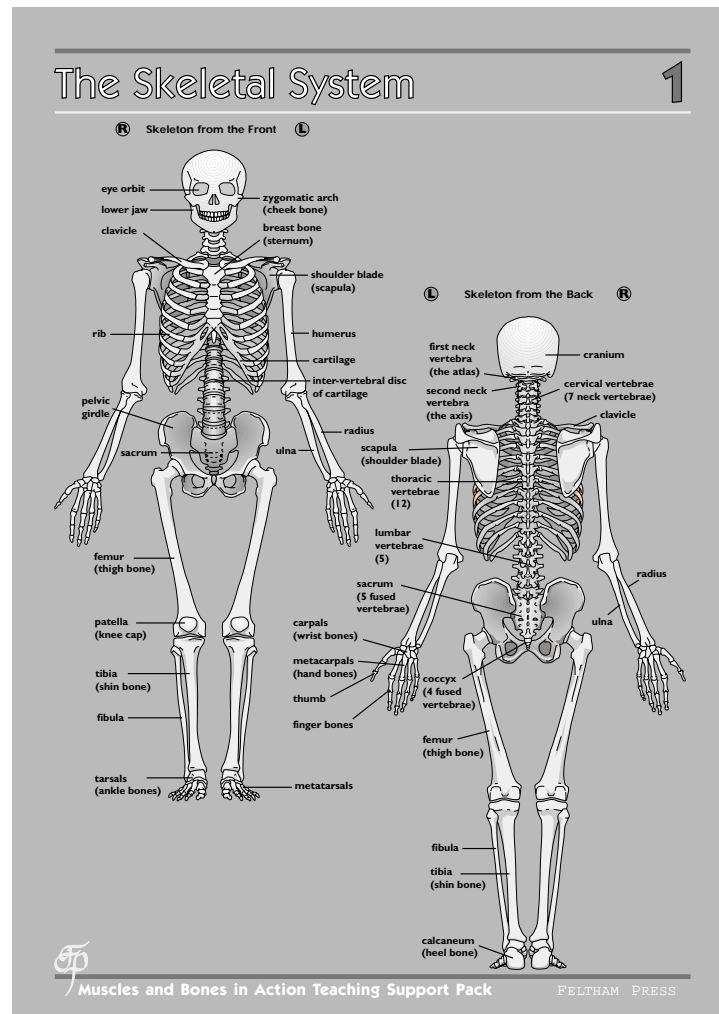
System Components The skeleton is made up of more than 200 bones which articulate with each other at joints. In the skeleton, ligaments join bones to bones, tendons attach muscles to bones, and the ends of the bones in most joints are protected from wear by cartilage.

Functions Functions of the skeleton include:

- ◆ Support of 'the body' of which it is an integral part of course, including movement by providing points of attachment for skeletal muscles.
- ◆ Protection of vital organs and systems.
- ◆ Production of red and white blood cells in the red bone marrow, which at birth is found in the centre of most bones, but is gradually replaced by non-productive fatty 'yellow' bone marrow until in the adult the productive red bone marrow is restricted to various 'short' bones such as the ribs.

Types of Bones

Image 1



- Shape & Function** Bones can be grouped by their shapes, which are linked to their different functions.
- Long Bones** These are found in the limbs, eg. the humerus, radius, and ulna, in the arms. Their main function is to work as levers, to increase the range of movement caused by the contraction of muscles.
 - Short Bones** These are found in the wrist and ankle joints, which are very complex with many short bones, which is why ankle and wrist injuries take so long to heal.
 - Irregular Bones** These have a wide variety of complex shapes, for example the vertebrae of the backbone, and the ribs. The vertebrae of the different regions of the backbone are adapted for different functions. The neck vertebrae allow movements of the head, and this mobility renders them prone to injury. The vertebrae in the lower back are larger and stronger than those in the neck, and allow less movement as they support the weight of the body. However, despite their strength and relative immobility, lower back problems are common.
 - Plate Bones** These are broad, flat bones, designed to protect special areas, for example some of the bones of the cranium protecting the brain; and for the attachment of broad origins of muscles, for example the shoulder blades.

Muscular Arrangements

Superficial muscles of the human body.
Not all muscles are shown and
those that are have been simplified

