

**DEFINITION**

1. **Osteochondrosis** - frequently referred to as **osteochondritis** - is a derangement of the normal process of bone growth which occurs at the various **epiphyses** of the bones.
2. An **epiphysis** is the part of a bone concerned with growth in length of the bone. In addition, it takes part in the formation of joints and acts as an attachment for muscles and tendons. Three types of epiphysis have been described -
  - 2.1. **Pressure epiphysis**, which transmits weight from one bone to another.
  - 2.2. **Traction epiphysis** or apophysis, situated at the point of attachment of muscles or tendons.
  - 2.3. **Atavistic epiphysis**, which represents a part of the skeleton which has lost its original function.
3. The epiphysis develops from a secondary centre of bone formation and is at first separated from the main bone by an area of unossified cartilage, later joining the shaft to make the adult bone. The cartilage between the epiphysis and the shaft is known as the **epiphyseal cartilage** and this only ossifies - thus joining the epiphysis to the body of the bone - when bone growth has ceased.
4. It follows from the above that any derangement of an epiphysis can only occur prior to the cessation of bone growth. No such change can occur after bone growth has ceased.
5. No epiphysis in the body is immune to the derangement and there is little doubt that the same underlying pathological process is present no matter in which epiphysis it occurs. However before it was realised that the derangement occurring at epiphyses in various parts of the skeleton was one and the same condition, the lesion in different epiphyses became known by the name of the original observer and led to the following eponymous classification -

**PRIMARY EPIPHYSES**

Vertebral body:	<b>Calve</b>
Carpal scaphoid:	<b>Preiser</b>
Lunate, adult:	<b>Kienbock</b>
Patella:	<b>Kohler</b>
Talus:	<b>Mouchet</b>
Tarsal scaphoid:	<b>Kohler</b>
Medial Cuneiform:	<b>Buscke</b>
Femoral trochanter:	<b>Monde Felix</b>
Patella:	<b>Sinding-Larsen</b>
Tibial head:	<b>Ritter</b>
Tibial tubercle:	<b>Osgood-Schlatter</b>
Os calcis:	<b>Sever</b>
Metatarsal head:	<b>Freiberg</b>

## SECONDARY EPHIPHYSES

Vertebral epiphysis:	<b>Scheuermann's</b>
Sternal end clavicle:	<b>Friedrich</b>
Humeral head:	<b>Hass</b>
Humeral capitellum:	<b>Panner</b>
Radial head:	<b>Brailsford</b>
Distal ulna:	<b>Burns</b>
Metacarpal heads:	<b>Mauclaire</b>
Iliac crest:	<b>Buchman</b>
Pubic symphysis:	<b>Van Neck</b>
Ischiopubic region:	<b>Oldberg</b>
Femoral head:	<b>Legg-Calve - Perthes</b>

## CLINICAL MANIFESTATIONS

6. There is often no symptomatic evidence of the condition which may only be discovered in later years during investigations for other matters.
7. Where there are manifestations, those often depend on the exact site of the osteochondrosis, deformity and affection of joints being more common in sites where there is weight-bearing by the bone concerned.
8. There may be complaint of pain, lack of function or deformity and, as osteoarthritis is not uncommonly produced in later years, the prime complaints may be related to the osteoarthritis.

## AETIOLOGY

9. Separate mention must first be made of **Kienbock's disease**, often referred to as **Osteochondrosis of the adult carpal lunate bone** or **lunatomalacia**.
  - 9.1. This condition, which is rare, differs from all the other osteochondroses in that it only affects fully formed tissue in which growth has been completed, whereas the true osteochondroses do not affect bone which has ceased growth.
  - 9.2. The same condition may affect other carpal bones in addition to the lunate. Buchman stated that it occurs in the navicular, the trapezium and the hamate. So many of Buchman's cases gave a definite history of injury that he named the condition **traumatic osteoporosis of the carpus**.
  - 9.3. There is usually a history of injury sustained while the hand is dorsiflexed but the trauma may be a minor one and, in some cases, no history of injury can be obtained.
  - 9.4. In view of the above, many hold that this condition should not be included with the osteochondroses but should be seen as secondary reactions to trauma of the adult bones involved.

10. With the exception of Kienbock's disease, which is discussed above, osteochondrosis occurs only during the growth phase of epiphyses. Osteochondrosis is thus a disease of children and young people.
  - 10.1. Most of the osteochondroses occur in early childhood when the epiphysis is mainly cartilaginous and growing rapidly.
  - 10.2. Some - such as Osgood-Schlatter's disease - occur at the time of the adolescent growth spurt.
  - 10.3. These conditions, with the exception of Freiberg's disease, are more common in boys than girls. This difference is thought to be due to the later appearance/maturation of secondary growth centres in males and the probability that boys are subjected to more trauma and stresses in early childhood than are girls.
11. Inflammation is not a feature of the condition.
12. Many authorities believe that some degree of trauma is needed, the degree varying according to the site of the osteochondrosis and the nature of the individual epiphysis
  - 12.1. Relatively severe trauma is needed for some sites such as the talus but relatively little trauma in, for instance, Perthes' disease.
  - 12.2. A normal epiphysis may give rise to osteochondrosis if exposed to extreme trauma.
  - 12.3. A mildly dyschondric epiphysis may give rise to osteochondrosis under excessive mechanical forces.
  - 12.4. A severely dyschondric epiphysis may give rise to osteochondrosis when exposed to the normal mechanical forces of weight-bearing.
13. Many authorities attribute osteochondrosis to circulatory disturbances in growing bone but without real evidence. Whilst there have been studies showing that there are ischaemic changes in association with osteochondrosis, the evidence does not indicate whether such ischaemia is secondary to the osteochondrosis or a cause of it.

## CONCLUSION

14. **Osteochondrosis** is a necrotic derangement of the epiphysis of a bone which may affect any epiphysis and for which a positive cause has not been identified. With the exception of **Kienbock's disease** (said by many to be a separate condition from the true osteochondroses) **osteochondrosis** occurs in children and young persons before the ossification of the epiphyses and the consequent cessation of bone growth. Osteoarthritis may develop in a joint adjacent to the site of osteochondrosis in later life.

## REFERENCES

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