GENU VALGUM (KNOCK-KNEE)

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INTRODUCTION
Have you noticed how your knees look like? If you observe carefully you will see that both your knees are not parallel but deviated slightly outwards by say 5-7 degrees. This outward bend is known as physiological genu valgum and nature has devised it this way.

It is an outward deviation of the longitudinal axes of both tibia and femur. Apex of the curve or angulations of the knee are medial.

Incidence
75% children have genu valgum up to 4 years of age. This is called physiological genu valgum, which usually disappears by 7 years.

Types
It is broadly classified into physiological and pathological; the latter could be unilateral or bilateral. This deformity may be seen only in one knee or both the knees.

If it is seen in one knee the causes could be:
• Due to growth abnormalities of upper tibial epiphysis.
• Infections like osteomyelitis, etc.
• Trauma near the growth epiphysis of femur.
• Tumors affecting the lower end of femur and upper end of tibia.

If it is seen in both the knees the causes could be:

Physiological (is corrected by four years): You might have noticed that in a new born child and children up to 4 years, the knees are normally bent outwards. This is known as physiological genu valgum because nature has devised it this way. Only if this deformity persists after 4 years of age then it is abnormal and you need to show to a doctor.

Pathological: The following diseases of the knee can lead to a more serious knock knee deformity that is not normal and needs to be treated by a doctor:
• Birth defects
• Postural abnormalities
• Developmental defects
• Rickets due to kidney problems (Common cause)
• Hormonal disorders
• Occupational disorders (e.g. in jockeys)
• Some diseases of the knee like Paget’s disease, Blount’s’ disease etc
• Fracture and injuries around the knees
**Clinical Features**

The primary deformity in a genu valgum is *a medial angulation of the knee*. In response to this, secondary deformities develop in the femur, tibia and foot. The commonest form of genu valgum is called idiopathic as the exact cause of its formation is not known:

The following are its features:
- Commonest variety.
- Invariably bilateral.
- Deformity is the only complaint.
- Occurs at the age of 2-3 years.
- Recovers by the age of 6 years.

Clinical photograph of a child having genu valgum deformity due to rickets

Clinical photograph of an adult showing genu valgum deformity due to a disease called flurosis

**Assessment of Genu Valgum Deformity**

*Clinical Assessment*

*Intermalleolar gap:* The severity of the deformity is measured by noting the intermalleolar distance.

*Method:* In the spine position, the patella is brought to vertical by rotating both the legs and made to touch lightly at the knee. Then holding both the knees in position, the distance between the two
malleoli is measured. The acceptable normal limit is 8-10 cm. In genu valgum deformity, it will be more than 10 cm.

*Plumb line test:* Normally, a line drawn from anterosuperior iliac spine (ASIS) to middle of the patella, if extended down strikes the medial malleolus. In genu valgum, the medial malleolus will be outside this line.

*Knee flexion test:* This is to detect the cause of genu valgum whether it lies in the femur or tibia. If the deformity disappears with flexion of the knee, the cause lies in the lower end of femur and if it persists on flexion, the cause lies in the upper end of the tibia.

**Radiographs**

Clinical assessment of genu valgum is less accurate in adults and an assessment by radiology is preferred. X-ray of the entire lower limb is taken with the patient weight bearing. The angle formed between the femoral and tibial shafts is measured on the radiographs and allowing for a normal angle of 6°, genu valgum is calculated.

![Plain x-ray of the knee showing the outer bending of the knees (Genu valgum)](image)

**Treatment of Genu Valgum**

*Mild cases:* Child is seen at intervals of 3 months and the progress is recorded. These cases usually require no treatment, and raising the inner side of the heels by 4-5 mm may possibly relieve strain on ankles. The knock-knee braces may be useful. If by the age of 4 years, inter-malleolar distance is 10 cm or more, operation may become necessary and unless deformity is increasing rapidly, operation is best postponed until the child is 10 years old.

*Severe cases*

- If lateral portion of epiphyseal plate is intact as seen in the radiographs, it contributes to the longitudinal growth at a reduced rate. This situation is suitable for stapling of the medial epiphysis, which arrests the growth on the medial side, allows the growth on the lateral side, and thus helps to correct the deformity.
- After skeletal maturity, an osteotomy must be performed at the site of maximum deformity of tibia or femur. If limb is long, *medial close wedge osteotomy* is done. If limb is short, *lateral open wedge osteotomy* is done. *Knock-knee deformity more than 10 cm at the age of 10 years is an indication for surgery.*

**Treatment facts of genu valgum**

- < 4 yrs—No treatment. Only observation.
- 4-10 yrs—Heel raise, knock-knee brace.
- 10-14 yrs—Epiphyseal stapling.
- 14-16 yrs—Wait until skeletal maturity, as it is too late for stapling and too early for osteotomy, as it may recur.
- > 16 yrs—Osteotomy.
Quick facts: Genu valgum

- Medial angulation of the knee.
- Seventy-five percent is physiological up to 4 years of age.
- Idiopathic is the most common type.
- Deformity is the only complaint.