BOW LEGS (GENU VARUM)
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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 genu is known as physiological genu valgum and nature has devised it this way.

But you might have seen elderly people especially females with both their knees bent inwards. *This condition is called bow knees (genu varum) because both the knees appear to have bent inside each other instead of the normal slightly outer presentation.* (Fig 1). This deformity involves tibia alone or the femur or tibia and fibula both.

Causes

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 upto 4 years, the knees are normally bent and tend to touch each other. This is known as physiological genu varum 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 bow knee deformity that is not normal and needs to be treated by a doctor:

- Birth defects
- Postural abnormalities
- Developmental defects
- Rickets
- Hormonal disorders
- Degenerative disorders (e.g. osteoarthritis of knee). This is a common cause.
- Occupational disorders (e.g. in jockeys)
- Some diseases of the knee like Paget’s disease, Blounts’ disease etc
Fig 1: Inward bending of your knees is called the knock knee deformity

Presentation

- This problem is more common in elderly people that too females and is due to degeneration of the knee joints and is called osteoarthritis of the knee. (Fig 3).
- The primary deformity in genu varum is **inward bowing of the knee**. (Fig 2)
- In response to this, secondary deformities develop in the tibia and the foot.
- Patient complains of pain during walking, standing etc.
- Limp may be present.
- Difficulty in carrying activities of daily living.
- Difficulty in using the Indian toilets.
- Difficulty in squatting on the ground to perform pujas etc (Fig 3).

Fig 2: Bow legs are common in elderly people and is commonly due to osteoarthritis of the knee
How to know that you have this deformity

- The patient is examined in a sleeping position with knee extended, patella facing the ceiling and the ankle touching each other. If the separation of knee exceeds more than 3 cm or if it is unilateral, it should be investigated. (Fig 4).
- A line is drawn from the outer aspect of the hip (called the anterosuperior iliac spine) through center of patella to inner side of the ankle (called the medial malleolus). Normally, all the structures are in the same line but in genu varum, the medial malleolus is medial to this line.
- For more accurate assessment, the angle of genu varum is calculated by the doctor on a standing radiograph of the whole limb.

Fig 4: In genu varum the distance between the inner knees is more than the normal 3 cms
Radiograph

Radiograph of the whole limb should be done to assess the severity of genu varum but also helps to know the extent of the diseases of the knee especially osteoarthritis of the knee. (Fig 5).

![Fig 5: Plain x-rays of the knee helps to know the extent of genu varum and also the disease like osteoarthritis of the knee](image)

Treatment

Before 4 years of age:
- Treatment is non-operative (conservative) until four years of age.
- Knee-ankle-foot orthosis with the medial bar and the lateral strap are used.
- Correction of early deformity is done by dynamic bracing or splints.
- After four years, significant deformity should be corrected by surgery.

After 4 years of age:

The treatment in this age group is mainly surgical and consists of the following methods:
- Stapling the outer aspect of the knee when the child is within the growth period and
- Cutting the outer portion of the tibia and straightening it is called tibial osteotomy or high tibial osteotomy and it could be either medial open or lateral closed wedge osteotomy and is done after the child attains skeletal maturity. (Fig 6).
- In Genu varum due to osteoarthritis of the knee in very advanced cases, the joints are replaced and is called total knee replacement surgeries. (Fig 7).
- If only inner half of the joint is replaced it is called Unicondylar knee replacement (Fig 8)
- and if all the three chambers of the joints are damaged, then the entire knee joint is replaced and is called the total knee replacement. (Fig 9)
Fig 6: Outer cutting of the tibia and closing the inner bending of the knee is called lateral closed wedge osteotomy and is done in young individuals.

Fig 7: In Knee replacement surgery, all the three compartments of the knee are replaced.

Fig 8: In Uni-condylar knee replacement, only the inner part of the diseased knee is replaced and is done in inner compartment osteoarthritis.
In Total knee replacement all the three compartments of the knee are replaced and is done in more advanced cases of genu varum due to osteoarthritis of the knee in elderly people.