

# Artificial limb grows without surgeries

Sumitra Deb Roy | TNN

## Magnet Magic



► Tejaswani, who lost a chunk of her thigh bone to cancer, fitted with an implant with a magnet and motor inside

► As the 12-year-old grows, a simple external procedure involving a coil generating an electromagnetic field will expand the implant to keep up with her growth. It will cut the need for repeated surgeries

**Detailed infographic, P 2**

**Mumbai:** It's now possible to make artificial limbs grow without repeated surgeries.

Twelve-year-old Delhiite Gude Tejaswini, who suffers from bone cancer, has become one of the 100-odd patients in the world to get her artificial limb to grow—non-surgically—by a few millimetres in a few minutes.

After she came to Mumbai on Friday, doctors at P D Hinduja Hospital put her through a 16-minute procedure to increase the length of the implant in her right leg without making an incision. The success of the procedure has ensured that the 12-year-old does not have to go through painful surgeries every few months to increase the size of the implant when the rest of her limb grows. What's more, it allows Tejaswini to walk, cycle and go to school just like any other kid. Costing about Rs 11.5 lakh, it was custom-made for Te-

jaswini in the UK using her CT scan and X-ray images. The implant comes with a screwdriver-kind of a mechanism that's activated by an external electromagnetic coil, which can increase the length of the limb at a rate of 1 millimetre in 4 minutes.

► She grew by 4 mm on Friday, P 2

## Tejaswani grew by 4 mm on Friday

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## BONING UP ON NEW TECH

**Mumbai:** Friday's procedure at the P D Hinduja Hospital on Gude Tejaswini's right leg increased it by 4 mm in 16 minutes.

A fall while cycling two years ago in her backyard resulted in Tejaswini experiencing excruciating pain and developing a swelling that refused to heal for days. The child specialist suspected the worst and referred her to Tata Memorial Hospital, where she was diagnosed with osteosarcoma (a cancer of the bones affecting mostly children and adolescents during their growth age between 10 and 20 years).

A major chunk of her right thigh bone had to be sawed off to stop the spread of the tumour but her doctor, orthopaedic oncologist Manish Agrawal, managed to save the rest of her limb as well as her knee joint. Doctors, however, could not save her growth plate in the kneecap (that determines the final length and shape of bones in adulthood).

But technology has come in handy, saving the girl from the pain of repeated surgeries to remove discrepancies between the length of the two legs. It also saves hospital cost and cuts down chances of infection.

Agrawal said technology now made it possible to avoid amputation in 80% of bone cancer patients. "So our priority is to ensure that they do not have to live with any handicap," he said.

About **2,400** bone cases are diagnosed every year and just about one per cent of all cancers is bone cancer

**OSTEOSARCOMA** is the most common type of primary bone cancer

It makes up for **35%** of bone cancer cases and affects those in the age group of 10-25

It often starts at the ends of bones, where new tissue forms as children grow. Knees are a common target

Proximal cemented intramedullary stem

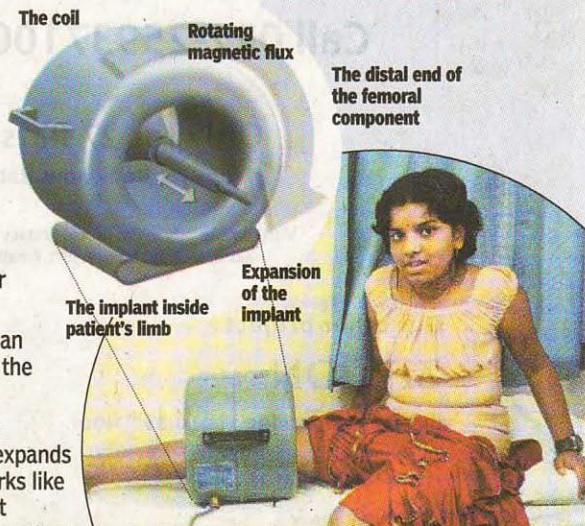
Inner segment slides longitudinally and moves away from the distal segment during lengthening process

Outer segment

Gearbox

### How Technology Works?

- Following surgery to remove cancerous tumour, the patient is fitted with the non-invasive expandable implant, which can be increased in size without cutting open the limb
- The implant has a magnet placed inside along with a motor and a gear system
- A coil from outside generates an electromagnetic field that turns the motor inside the implant on
- The miniature gears allow the movement of the motor, which expands the limb. In simpler terms, it works like a screw driver inside the implant



### Advantages

- Repeated surgeries to manually increase the size of limb is not required
- Apart from hospital stay, patient also saves on surgery complications and cost
- There is no pain or stiffness when the implant lengthening is done

### Disadvantages

- As patient grows up, there are some chances that the implant may break
- As the child grows up, a new adult implant may be required
- The gears inside the implant can heat up during lengthening. Doctors have to be aware that it does not cause any damage to the soft tissues