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Indian Journal of Orthopaedics Surgery

Journal homepage: www.ijos.co.in

Editorial

Non unions management nightmare

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Received: 02-03-2025; **Accepted:** 21-03-2025; **Available Online**: 04-04-2025

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Nonunions have been a known and dreaded complication of fractures.

There are different types of situations which are encountered in the day to day practice of any orthopaedic surgeon.

There can be various contributing factors which an Orthopaedic surgeon has to keep in mind before embarking on the type of treatment he or she has to offer to the fracture, that it does not land up in nonunion.

The factors could be related to patient or to the surgery.

The patient-related factors include:

1. Addiction, like smoking, alcohol, narcotic overuse.
2. Malnutrition.
3. Compound fractures.
4. Delayed treatment.
5. Not following the proper instructions of the surgeon.

The surgeon-related factors are in the hand of treating surgeon, and his expertise these can be summarized as,

1. Stability, relative stability of a fracture promotes healing by callus formation.
2. Rigidity gives primary intention healing.
3. Thorough debridement of compound fractures.
4. Proper asepsis and clean milieu.
5. Preventing re-injury by braces.

There are some signs, which every orthopaedics surgeon should look for at every follow up of the fractured patient, like, signs of infection, raised local temperature, disproportionate pain, swelling and blood parameters.

The X-rays in two planes are equally important, and should be critically evaluated to see for any loosening of the implant or signs of infection.

Once in doubt it is always imperative to have regular blood tests in the form of CRP, total counts, and if need be culture of local tissue to ascertain which Antibiotic can be used effectively.

The radiological investigations in the form of CT scan help us to ascertain the status of Fracture healing, though not very significant tool.

MRI is good tool but not possible with the implant inside at every centre.

Now a days PET scan is being used to ascertain the infection and its extent. Bone Scans and radiolabelled scans like gallium scan are also useful, if the facility is available.

Radiologically, the fractures are classified as atrophic oligotrophic and hypertrophic, atrophic nonunion have loss of vascularity and the bone ends are tapered, the cause lies in the fracture and its treatment where either the fracture was not stable or rigid. There are certain bones which have a precarious blood supply and tend to go into atrophic nonunion. These fractures require bone grafts to unite.

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https://doi.org/10.18231/j.ijos.2025.001
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Oligotrophic are those nonunions where the process of union started well but got halted due to loss of reduction, vascularity, or there was micromotion of the fractures. These require increase of the stability and stimulating the bone ends to unite by bone grafts.

Hypertrophic nonunions are mainly due to increased micromotion and inadequate compression of the fracture ends, they heal faster and better once the stability is increased. These nonunions do not require additional bone grafting.

Infected nonunions are either stiff or mobile.

These are the most difficult set of nonunions and these require a multipronged approach to treat.

When considering an infected nonunion, we should consider whether the fracture has live bone, whether the ends are aligned, whether there is apposition of the ends, stability and limb length discrepancy.

The methods of eradicating infection are many, but the main crux of all of these procedure is debridement and having a healthy bone ends.

The canal should be opened and the glycocalyx or biofilm should be removed.

The gap so formed can be filled with either Bone cement or cement beads or even muscle with stabilization of fracture with external fixation. This should be followed by copious bone grafting.

The ultimate union can also be achieved by transport of bone and filling the gap using Ilizarov ring fixation.

The newer orthobiologics also provide promising results, now available in the form of growth factor concentrates derived from patients own plasma, more advanced then the PRP. These increase osteoblastic activity, by converting the pluripotent cells to osteoprogenitor cells, which are lined in the mesenchymal layer of the bones, periosteum, and soft tissues, and thereby they increase the chances of bone union, but these should be used in adjunct to the stabilizing devices, like external fixators, nails or plates.

The bone morphogenetic proteins are also available mainly BMP7 and 21 are used as injections in the local fracture milieu.

There are certain other orthobiolgics, like calcium phosphate putties which can be added with Antibiotics for local eradication of infection along with spacer and bone healing stimulant.

Recommended Reading

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Cite this article: Sharma J. Non unions management nightmare. *Indian J Orthop Surg*. 2025;11(1):1–2