Treatment of non union of humerus using hybrid tradition ilizarov technique
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Abstract
The management of the non union of the humerus is one of the most challenging problems that the surgeon confronts in his practice. The procedures traditionally used are: I. M. Nailing, interlocking, plating, transplantation of allograft. In our series, 43 cases with non union has been treated by G. A. Ilizarov technique. The age range were: 20-60 years with an average of 30 years. The initial treatment were done by DCP, rush nails and plates with screw fixation. The duration of treatment range from 5-10 months (average 7 months). With the application of Ilizarov fixator with hybrid tradition a good range of elbow and shoulder motion were achieved. The average follow up period was 5 years with a range of 1-9 years. Union was achieved in all the 43 cases.

Index words
Non union of humerus, Hybrid tradition Ilizarov technique.

Introduction
Humeral non union are often painful and unstable. Good surgical management is sometimes very difficult. Fixation with plates and screws and bone grafting may fail. The outcome of revision operation may be adversely affected by restricted movement of elbow. In most cases, the patient has been several times operated with resultant scarring and cicatrisation of the surrounding soft tissues. These renders the environment around the fracture site avascular. Non union occurs most commonly in transverse or comminuted, middle and lower one-third fractures, fractures with distraction or soft tissue interposition, open fractures, infection and fractures treated by internal fixation. Non union rate in closed fractures varies from 0-6%, while the non union rate after open reduction ranges from 0-12%. Success rates after DCP and autogenous grafting ranges from 90-95%. Recent studies showed that hybrid tradition Ilizarov technique is more popular than vascularised bone grafts for humeral shaft non unions2,3,4.

Methods
For the last 13 years (1992-2004) in different hospitals including NITOR for 43 cases of humeral non union aged from 20-60 years were treated. 32 cases were following previous operation failure and 11 cases were failure of conservative treatment. 2 pairs of
transosseous crosswires were fixed to two rings one above and one below the non union site. Half pins or schanz screws with one 90 degree Italian arch with oblique support was connected with the upper ring for further stabilization. Correction and compression obtained through threaded rods to induce osteogenesis.

**Results**
In all the 43 cases, bony union was achieved. The mean period of bony union was 7 months. The range was 5-10 months. The main aetiology was open fractures as presented on Table I.

<table>
<thead>
<tr>
<th>Open Fracturs</th>
<th>23 cases</th>
</tr>
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<tbody>
<tr>
<td>Complication of surgically treated fractures (failed open reduction)</td>
<td>12 cases</td>
</tr>
<tr>
<td>Osteomyelitis</td>
<td>8 cases</td>
</tr>
<tr>
<td>Total</td>
<td>43 cases</td>
</tr>
</tbody>
</table>

**Discussion**
Nailing, plating and bone grafting are the accepted traditional method of managing non union of humerus. But a significant number of patients requires other procedures. Ilizarov technique for the treatment of humeral non union with hybrid has many advantages but several technical problems may arise if the details of the technique are not followed precisely. For successful outcome it is important to maintain the bone ends in good and stable fixation. Another important factor is to achieve good contact with the bones. A partial contact in one of our 3 cases was the cause of non union but in those cases we refixed the apparatus and later on good union was achieved. Fixation with Ilizarov apparatus in the upper middle and lower third by using half pins or schanz screws with 90 degree Italian arch and oblique support is biomechanically and anatomically superior to that with a plate. The most important thing is that the patient can mobilize the shoulder and elbow soon after the operation with Ilizarov apparatus.

**Conclusion**
The Ilizarov hybrid tradition technique for the treatment of humeral non union is very effective and offer many advantages. The advantages of this technique are that it allows for the simultaneous treatment of infection, non union, shortening, deformity and problems of soft tissues. In our all cases complications were not serious and did not affect the results.

**References**
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