Reconstruction of metacarpals using bone grafts
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Introduction
Reconstruction of metacarpal defects following resection of tumours or trauma can be a challenging problem. In the presence of a healthy soft tissue bed, non-vascularised bone grafts such as from the iliac crest can be used with success. However when the soft tissues are not optimal, vascularised bone grafts are recommended.

Objective & Methods
We wished to review the operation detail, post-op recovery and outcome in the above group of patients described, noting any major complications such as flap loss or bone resorption leading to non-union. This retrospective analysis covered 10 years, with cases drawn from consultants’ collections.

Case 1 details & outcome
23 year old male, who suffered a significant blast injury, reconstructed with a free serratus flap with ribs. He had multiple further procedures where reconstruction was complex and extensor tenolysis was required; however, resultant flexor ability of the hand was quite remarkable.

Case 5 details & outcome
20 year old female with low grade chondrosarcoma of the little finger metacarpal. Initially planned for second toe metatarsal with MT joint vascularised bone graft. However, patient did not want a complex procedure, so a resection and reconstruction with iliac crest bone graft with plates was carried out successfully.

Summary & Conclusions
Our work has shown the need for an individualised approach, based on the bone defect encountered, the realistic function achievable and the wishes of the patient. We centre our approach around the reconstructive triad shown below and use the algorithm for managing bone defects as illustrated.

Managing bone defects algorithm

<table>
<thead>
<tr>
<th>Indication</th>
<th>Type of Reconstruction</th>
<th>Complication?</th>
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</thead>
<tbody>
<tr>
<td>1   Trauma (Blast injury)</td>
<td>Serratus with ribs</td>
<td>Tendon adhesions</td>
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<tr>
<td>2   Trauma (Gunshot wound)</td>
<td>Iliac crest bone graft (delayed reconstruction)</td>
<td>Stiffness</td>
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<tr>
<td>3   Trauma (Farmhouse accident)</td>
<td>PIA flap with ulna – filleted little finger bones</td>
<td>None</td>
</tr>
<tr>
<td>4   Trauma (Blast injury)</td>
<td>Iliac crest bone graft</td>
<td>None</td>
</tr>
<tr>
<td>5   Tumour resection (Chondrosarcoma)</td>
<td>Iliac crest bone graft</td>
<td>None</td>
</tr>
<tr>
<td>6   Tumour resection (Chondrosarcoma)</td>
<td>Iliac crest bone graft</td>
<td>None</td>
</tr>
<tr>
<td>7   Tumour resection (Chondrosarcoma)</td>
<td>Iliac crest bone graft</td>
<td>None</td>
</tr>
</tbody>
</table>

Form
Safety
Function

Soft tissue defect

Present

Composite flap or Flap & delayed bony reconstruction

Non-vascularised bone graft

Consider vascularised bone graft

Multiple metacarpals / involving MCP joints

Absent

Single metacarpal