iii) Subluxation
most cases can be treated conservatively

iv) # atlas - often a burst # (Jefferson's #)

by vertical force

↓

traction f/b minerva cast jacket
or halo pelvic jacket

(v) atlanto axial # =

(vi) Clay shoveller's # = # of spinous process of D1

(vii) Displacement of IV

Cervical Injury

New neuro deficit

No

alignment

Maintain

Traction

Collar or some fusion

Accelerate

Not Acute

Stable

Continue ORIF

Success

Yes

No

Reduction by traction

Same as (v)

Success

Yes

No

Reduction

@

Decoup ORIF
Tilt of Thoracic/Lumbar
- Generally conservative if sufficient \( \Rightarrow \) Brace
- Some consider an aggressive approach

**Indication:**
- Partial Neuro deficit & CT/MRI proved compression of Spinal Cord
- Worsening of Neurodeficit
- Multiple Injury Patient

**Methods:**
- Harrington Instrumentation - BIL
- Luque Instrumentation
- Halo skeletal traction fixation
- Karru Screw fixation

**Injury:**
- Neurological deficit

**NO**

**Yes**
- MRI
  - Compression
    - Decompression and Internal fixation
  - ASH Brace
- Canal not compressed
  - ASH Brace
Colle's

Cephal end of radius at costico-
coracoid junction with typical
displacement.

Normal = ( ) =>  

Clinical feature = Swelling with annular fork deformity

Radiological = Dorsal displacement
Dorsal tilt
Radial displacement
Radial tilt
Proximal Shift
Impaction

Dorsal
Dorsal
T1→essentially conservative
#

Undisplaced

- Below elbow plaster cast for 6 weeks
  (Colles Cast)

- Manipulative reduction

Displaced

- Fracture & Counter fracture
  - Correction of cubital tilt
  - Correction of radial tilt
    (Colles cast)

- Finger movement encouraged

2. Alternatively: K wire fixation
3. Ligamentous repair also be done
Complication of Colles

- Joint stiffness
- Malunion
- Subluxation of inferior RU joint
- Carpal tunnel syndrome
- Erb's palsy - Orthopedics
- Rupture of extensor pollicis longus
Differential dx of solitary bone lesion

<table>
<thead>
<tr>
<th>Features</th>
<th>Giant cell tumour</th>
<th>Simple bone cyst</th>
<th>Intramedullary bone cyst</th>
<th>Fibrous dysplasia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>20-40 yrs.</td>
<td>&lt;20 yrs.</td>
<td>10-10 yrs.</td>
<td>20-30 yrs.</td>
</tr>
<tr>
<td>Common bones</td>
<td>Lower femur, Upper tibia, Lower radius</td>
<td>Upper humerus, Upper femur</td>
<td>Tibia</td>
<td>Neck of the femur, Tibia</td>
</tr>
<tr>
<td>Location</td>
<td>Epiphysis</td>
<td>Soap-bubble appearance, eccentrically placed</td>
<td>Metaphysis</td>
<td>Multi-loculated ground-glass appearance</td>
</tr>
<tr>
<td>X-ray</td>
<td>Metaphysis</td>
<td>Maximum width less than width of the growth-plate</td>
<td>Distending lesion, ballooning the bone</td>
<td>Trabeculations++</td>
</tr>
<tr>
<td>Treatment preferred</td>
<td>Excision</td>
<td>Curettage and bone graft</td>
<td>Curettage and bone graft</td>
<td>Curettage and bone graft</td>
</tr>
</tbody>
</table>

Osteoclastoma = Generally benign lesion
Malignant potential

- Age > 20-40 years
- C/I/F = Pain, Swelling of months duration
- Epiphysis, lower femur, upper tibia, lower radius
- X-ray: Soap-bubble appearance
- Solitary lesion
- No calcification
- No osteosclerosis
1. Excision

2. Excision with grafting [Reconstruction]

   - Arthrodesis
     - By means of plastic knee → Required
     - Length of tibialis anterior

   - Arthroscopy
     - Autograft / Aucograft

3. Curettage with or without supplementary procedure → Cryo-therapy
4. Amputation
5. Radiotherapy

Osteosarcoma = Malignant

Age = 15-25 years

C/F = Pain, Swellup, Duration weeks and months

Lower end femur, upper end of tibia metaphysis

X-ray = S = Sunray appearance
P = Periosteal reaction
E = Elevat
N = New bone formation
I = Irregular destruction
C = Codman triangle
Fig 30.5: Treatment plan for osteosarcoma.

Clinical suspicion

Local part X-ray and chest X-ray

- Biopsy confirms the diagnosis
  - New bone formation
  - ls pathognomonic

Chest X-ray normal

- Chest X-ray shows secondaries
  - Single on C.T. scan
  - Multiple

Local control (A)

- Control of metastasis
  - Neo-adjuvant chemotherapy
  - Adjuvant chemotherapy

Limb ablation surgery

- Limb-saving surgery

Radical resection with reconstruction

- Arthrodesis
- Joint replacement

Prognosis good

- Patient uses artificial limb

Prognosis fair

Prognosis poor

Table 30.3: Osteosarcoma—level of amputation.

<table>
<thead>
<tr>
<th>Site</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower end of femur</td>
<td>Mid thigh* amputation, Hip disarticulation</td>
</tr>
<tr>
<td>Upper end of femur</td>
<td>Hip disarticulation, Hindquarter amputation*</td>
</tr>
<tr>
<td>Upper end of tibia</td>
<td>Mid thigh amputation</td>
</tr>
<tr>
<td>Upper end of humerus</td>
<td>Forequarter amputation*</td>
</tr>
</tbody>
</table>

* Only for early lesions.
of the tumour is implanted into a sarcoma
survivor and is removed after 14 days. The
sensitised lymphocytes from the survivor are
infused into the patient. These cells then
selectively kill the cancer cells.

d) Follow up: The patient is checked up every 6-8
weeks. Any evidence of recurrence of the
primary tumour, or appearance of the
secondary (usually in the chest) is diagnosed
early and treated.

Plan of treatment: A practical plan for
management of a case of osteosarcoma is shown
in Fig-30.5.

Prognosis: Without treatment, death occurs within
2 years, usually within 6 months of detection of
metastasis. Five-year survival with surgery alone
-20 per cent. With surgery and adjuvant
chemotherapy, a 5-year disease-free period is
reported to be as high as 70 per cent. A primarily
lytic type (telangiectatic) osteosarcoma has the
worst prognosis.

SECONDARY OSTEOSARCOMA
This is an osteosarcoma developing in a bone
affected by a pre-malignant disease. Some such
diseases are as given in Table-30.4. The tumour is
usually less malignant than the primary
osteosarcoma. It is seen in the older age group [after
40 years]. Treatment is along the lines the
conventional osteosarcoma.

Table-30.4: Pre-malignant bone lesions.

- Paget’s disease
- Diaphysial aclasis
- Enchondromatosis
- Post-radiation

PAROSTEALE OSTEOSARCOMA
This is a type of osteosarcoma, arising in the region
of the periosteum. It is a slower-growing tumour,
seen in adults. The common site is lower end of the
femur. Treatment is on the lines of osteo-sarcoma.
Prognosis is better.

Ewing’s SARCOMA
This is highly malignant tumour occurring between
the age of 10-20 years, sometimes upto 30 years.

Pathology: The following are some of the important
pathological features:

- Bones affected: It commonly occurs in long bones
(in two-thirds cases), mainly in the femur and
tibia. About one-third of the cases occur in flat
bones, usually in the pelvis and calcaneum.
Occasionally, it is known to have a multi-centric
origin.

Site: The tumour may begin anywhere, but
diaphysis of the long bone is the most common
site.

Gross pathology: The tumour characteristically
involves a large area, or even the entire
medullary cavity. The tumour tissue is gray-
white, it is soft and may be thin, almost like pus.
The bone may be expanded, and the periosteum
elevated, with subperiosteal new bone formation,
often in layers. The tumour rupture through the
cortex early, and extends into the soft-tissues.

Histological: The tumour comprises of sheets
of quite uniform, small cells, resembling
lymphocytes. Often, the tumour cells surround
a central clear area, forming a pseudo-rosette.
The tumour grows fast and metastasises through
the blood stream to the lungs and other bones.

Clinical features: The tumour occurs between 10-
20 years of age. The patient presents with pain and
swelling. There may be a history of trauma
preceding onset, but it is usually incidental. Often
there is an associated fever, in which case it may
be confused with osteomyelitis. On examination,
the swelling is usually located in the diaphysis and
has features suggesting a malignant swelling.

Radiological features: In a typical case, there is a
lytic lesion in the medullary zone of the midshaft of
a long bone, with cortical destruction and new bone
formation in layers—onion-peel appearance [Fig-
30.6]. In atypical presentations, the tumour may
be located in the metaphysis, and may be confused
with osteomyelitis. It may have a predominant soft-
tissue component with little cortical destruction,
and may resemble a soft-tissue sarcoma. In flat
bones, it is primarily a lytic lesion with hardly any
new bone formation.

Differential diagnosis: Ewing’s sarcoma can be
differentiated from other bone tumours by features
given in Table-30.5. From chronic osteomyelitis, it
can be differentiated by the following features in the
former:

- Sequestrum
- Well-defined cloacae and a rather smooth
periostal reaction
- Located at metaphysis

Treatment: This is a highly radio-sensitive tumour,
melts quickly but recurs. In most cases, distant
metastasis has occurred by the time the diagnosis
is made. Treatment consists of control of the local
tumour by radiotherapy (6000 rads), and control
of the metastasis by chemotherapy. The
chemotherapy consists of Vincristine,
Cyclophosphamide, and Adriamycin in cycles,
repeated every 3-4 weeks for about 12-18 cycles.

Prognosis: It is very poor. Bone to bone secondaries
are very common. With the availability of potent
chemotherapeutic drugs, 5-years survival (which
was only 10 per cent), has now improved to 30-40
per cent.