

# Immobilisation Hypercalcaemia post Road Traffic Accident

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## BACKGROUND:

Immobilisation hypercalcaemia is serious complication of prolonged immobility of any cause such as spinal cord injury, polio victims, burns victims, in weightlessness (astronauts) as well as trauma patients. We present a case of young patient with hypercalcaemia due to prolonged immobility following road traffic accident.

## CASE REPORT:

18 years old student was admitted to the hospital (trauma CENTRE) following road traffic accident (motor bike). He sustained multiple fractures, skull, spine (T7-L5), chest and pelvis. He also sustained abdomen and pelvic haematoma. At scene of crash he had GCS 5/15, needing intubation and airlifted to trauma centre, where he underwent extensive surgery laparotomy and pre-peritoneal packing, reduction of fracture dislocation of ankle, open reduction and fixation of bilateral pelvic fracture and acetabulum. His past medical includes orchidectomy after failed orchidopexy, and epistaxis. After transferred to his local Hospital for rehabilitation. His bloods showed Na<sup>+</sup> 143mmol/L, K 3.3mmol/L, creatinine 45µmol/L, calcium 3.0mmol/L, PTH 0.9pmol/L, 24 hour urinary calcium 15.1 mmol/L, vitamin D 46nmol/L, phosphate 1.08mmol/L, ALP 95U/L, AST 45U/L, Hb 12g/L. He had normal calcium (2.25mmol/L) during his initial admission to the trauma centre.

He was treated with intravenous fluids and pamidronate 30mg single dose and his calcium level normalised. His calcium remains normal and the patient is undergoing physiotherapy, with improving mobility.



Fig.1-xrays post surgery

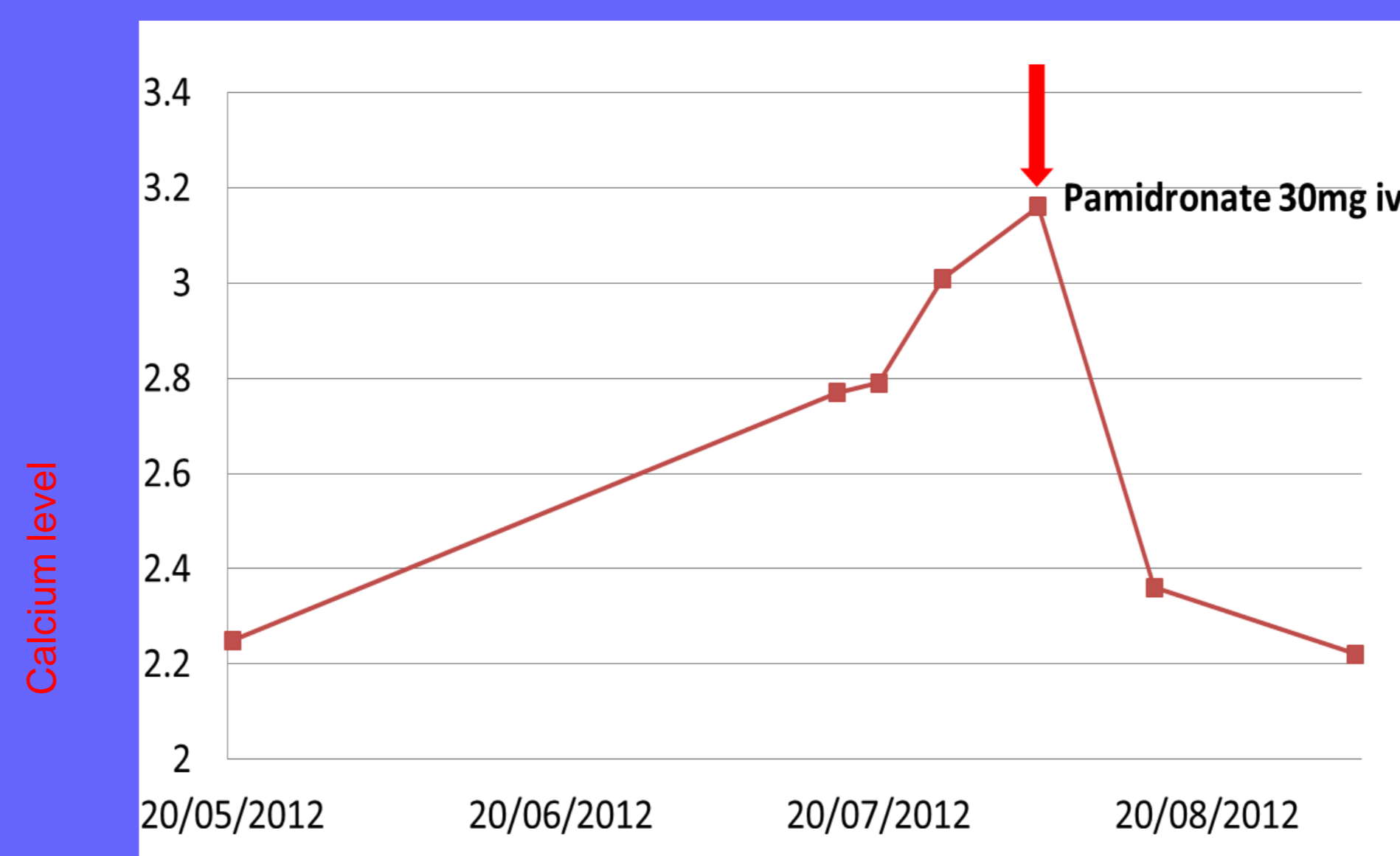


Fig.2-Calcium levels (trend)

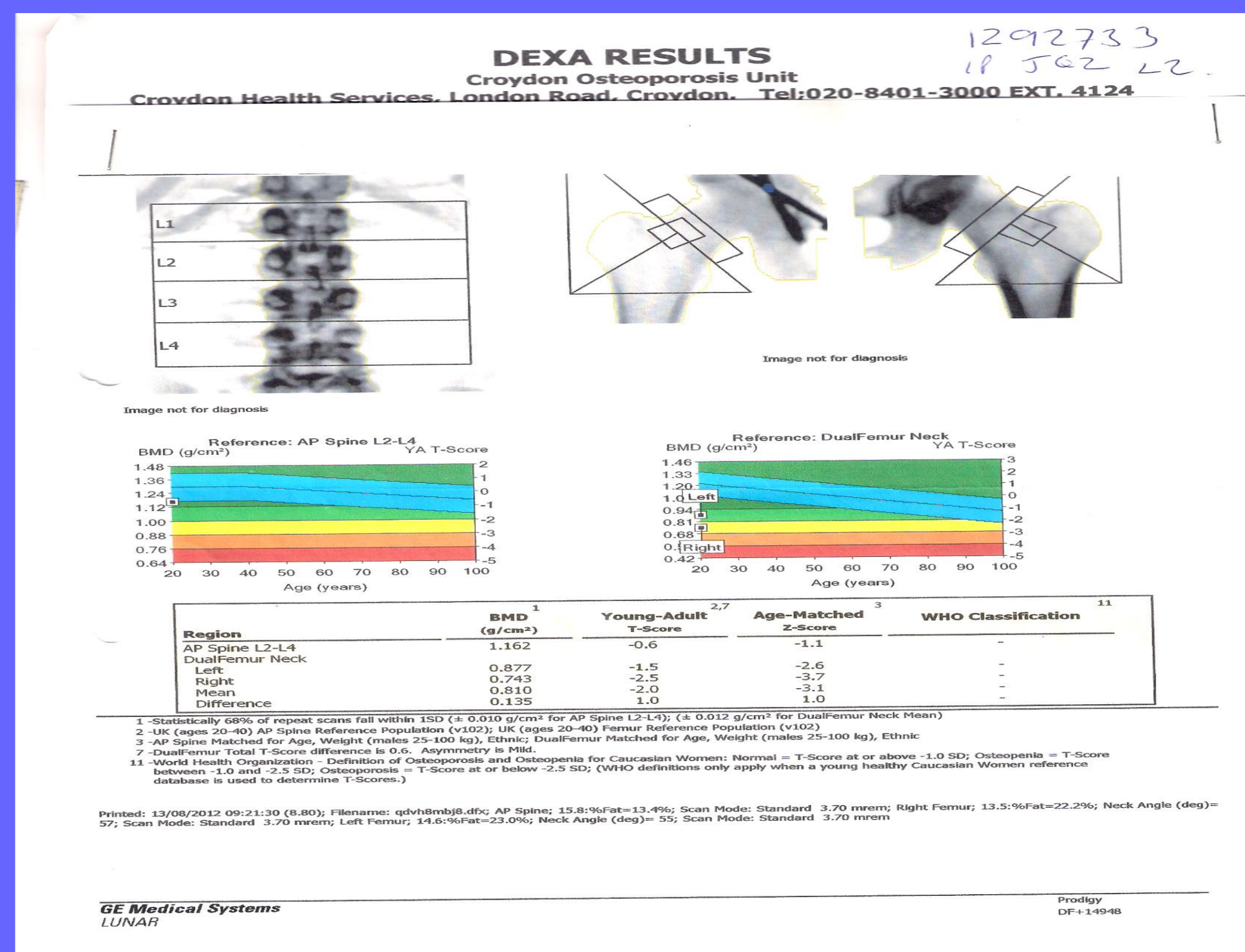


Fig. 3 Bone density with evidence of osteoporosis

## DISCUSSION:

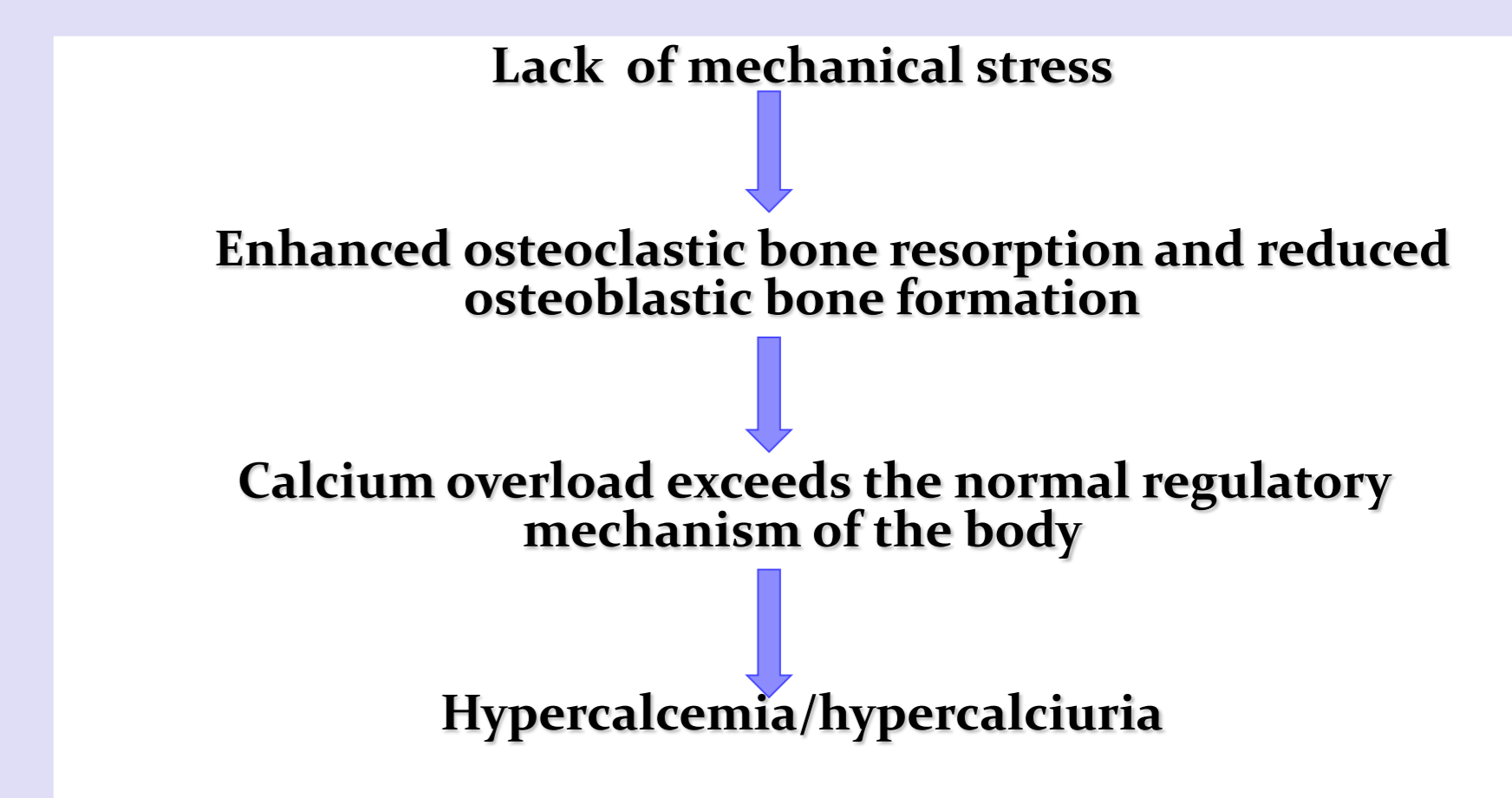
Common complication of prolonged immobility First described by Albright and colleagues 1941 (Albright F et al)

Common among younger patients due to higher bone turnover. It's characterised by increased bone resorption with radiological evidence of osteopenia. There is increased osteoclastic activity. Resorptive hypercalcaemia is a universal finding. Hypercalcaemia in a small percentage of patients may cause renal stones.

Common complication of spinal cord injury in the young (affects 11-22% tetraplegic patients (Maynard et al)). Usually develops 4-6 weeks post trauma (1-16 weeks). May remain elevated for up to 12 months depending upon mobilization.

## POSSIBLE MECHANISM OF IMMOBILISATION HYPERCALCAEMIA

1. The force of gravity puts mechanical stress on the bone (increases osteoblastic activity) without gravity there is bone loss (as in Astronauts).
2. Circulating hormones (PTH, Calcitonin, Insulin, thyroid hormone, vit. D, Sex steroids, and GH).
3. The autocrine and paracrine factors derived from osteoblasts and osteoclasts.



## CONCLUSION:

Immobilisation hypercalcaemia is not a benign condition and it may cause osteoporosis and renal stones and it has to be considered as a differential diagnosis in subjects with prolonged immobility of any cause. The treatment of immobilisation hypercalcaemia includes mobilisation, intravenous fluids, and bisphosphonates. Our patient was successfully treated with intravenous fluids and 30mg of intravenous pamidronate.

## References

1. Albright et al - Acute atrophy of bone (osteoporosis) simulating hyperparathyroidism. J Clin Endocrinol 1941; 1:711-716
2. Maynard F.M. Immobilisation hypercalcaemia following spinal cord injury. Arch Phys Med Rehabil 1986; 67: 41-44
3. Carey, D.E et al - Calcitonin therapy in prolonged immobilisation hypercalcaemia. Arch Phys Med Rehabil 1985; 66:640-644
4. Stewart, A.F et al - Calcium homeostasis in immobilisation as an example of resorptive hypercalcaemia. N Engl J Med 1982; 306:1136-1140
5. H.D. McIntyre et al - Immobilisation hypercalcaemia responding to intravenous pamidronate sodium therapy. Postgraduate Medical Journal (1989) 65, 244-246
6. Collet P et al - Effect of 1 and 6 months spaceflight on bone mass and biochemistry in 2 humans
7. Rambaut et al - Apollo nutritional studies (Lyndon B Johnson space centre).
8. Stephen J. Gallacher et al - Immobilisation related hypercalcaemia - a possible novel mechanism and response to pamidronate. Postgrad Med J (1990) 66, 918-922