

Imaging Insights- #3

Case Study

Knee Pathology

In this case, a 10 year old boy had a sports injury in Sept. 2006 with a severe fracture-dislocation of the distal femur. There was a second injury one year later in Sept. 2007, at which time a growth plate deformity was noted, which progressed ultimately necessitating surgery to correct this.

The treating physician did not identify the developing growth plate and osteochondral injury, and related all of the growth plate injury to the second accident only, which was clearly not the case.

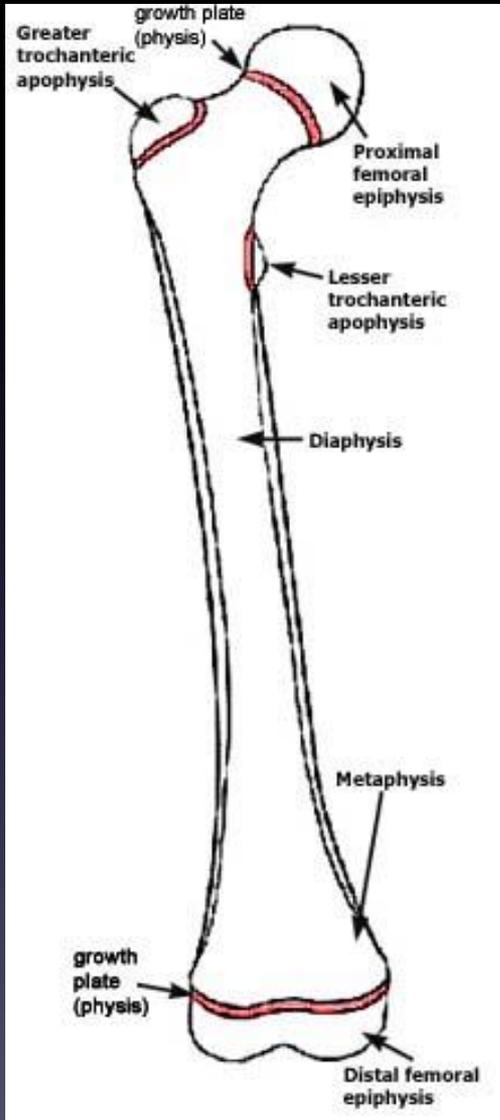
Review of studies following the first accident clearly showed the abnormalities to be present at that time, and the studies performed following the 2007 accident showed changes which were chronic and could not have been caused by the Sept. 2007 event.

This presentation illustrates the sequence and nature of the findings.

Timeline: 10 yo little leaguer

- Sept. 2006 –injury #1; severe fracture of femur
- Treated until Jan. 2007 with healing of fx. No other findings noted.
- Sept 2007- injury #2. Treated with same ortho. Xrays showed no acute abnl.
- MRI 3 wks later shows growth plate fusion and chronic osteochondral injury, but ortho relates all to injury of 2007, not 2006
- Lawsuit brought against Town for injury #2

The Growth Plate



The bones of children and adults share many of the same risks for injury. However, a child's bones are also subject to a unique injury called a growth plate fracture.

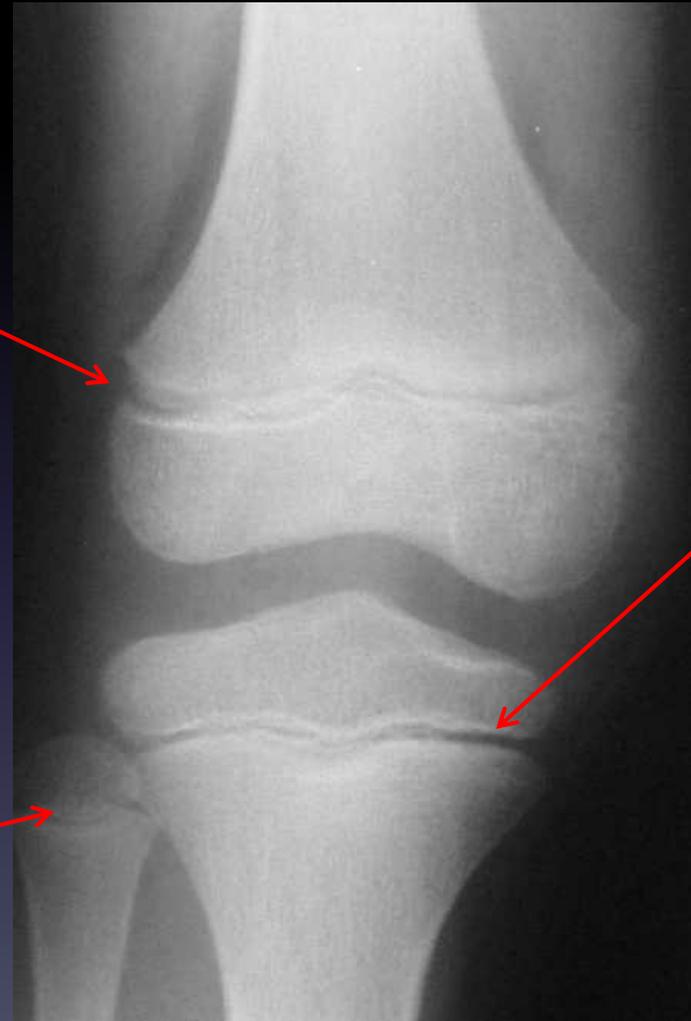
Growth plates are areas of developing cartilage tissue near the ends of long bones. The growth plate regulates and helps determine the length and shape of the mature bone.

The long bones of the body do not grow from the center outward. Instead, growth occurs at each end of the bone around the growth plate. When a child becomes full-grown, the growth plates harden into solid bone.

Normal x-ray of child's knee

femur

Note the normal growth plates
Of the femur, tibia and fibula.



tibia

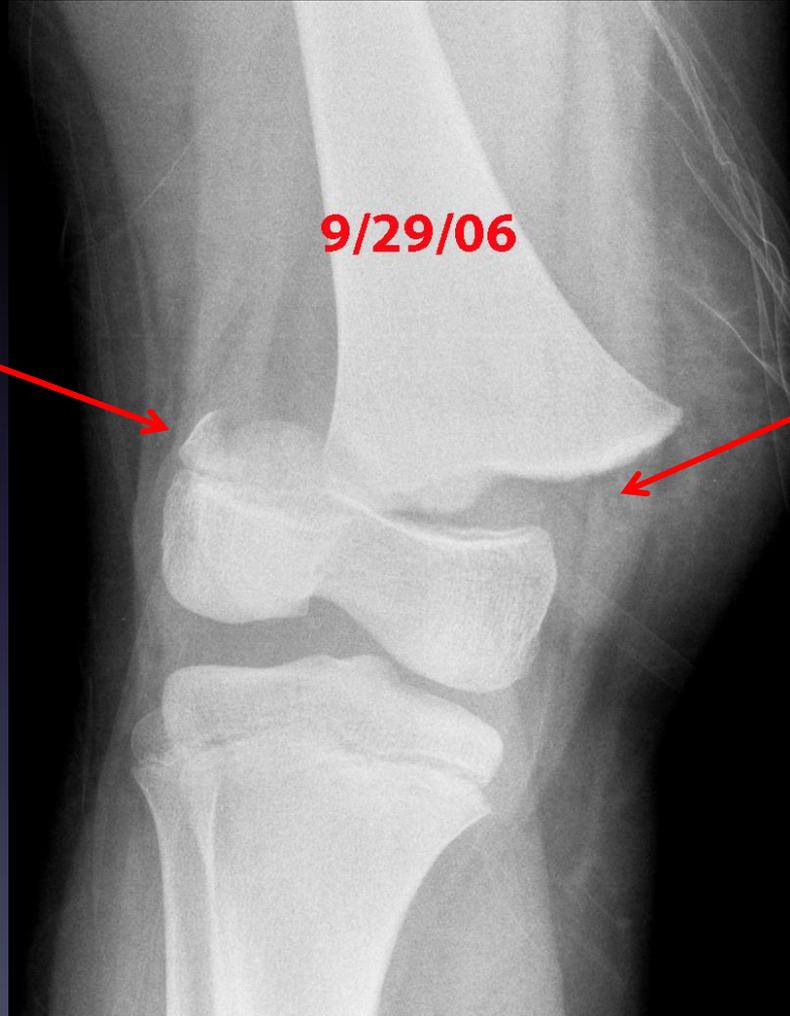
fibula

Injury #1: 9/29/06

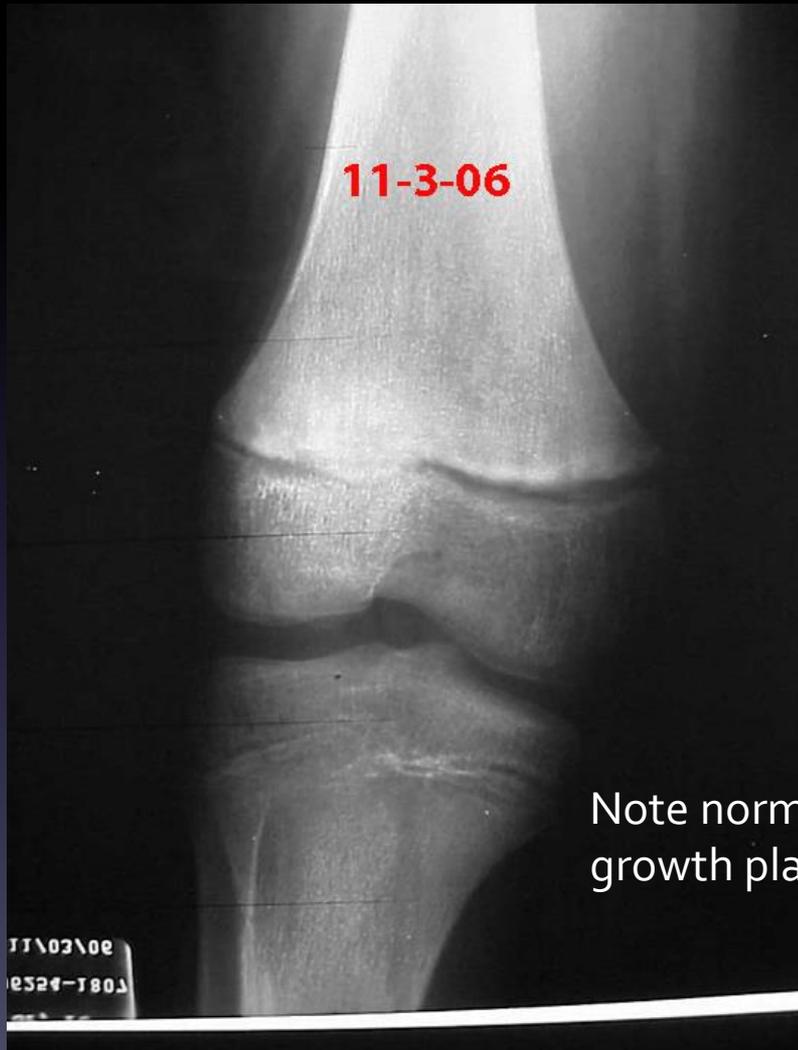
Fracture
fragment

9/29/06

Complete disruption
of growth plate



Follow up x-rays out of cast



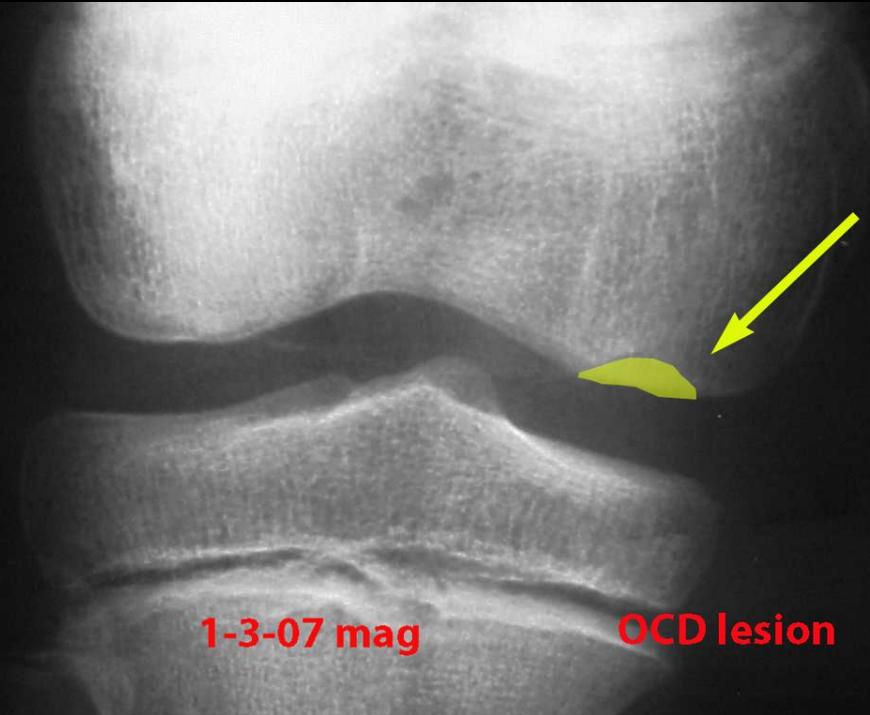
Note normal, dark line of growth plate at this time

X-ray of 1/3/07

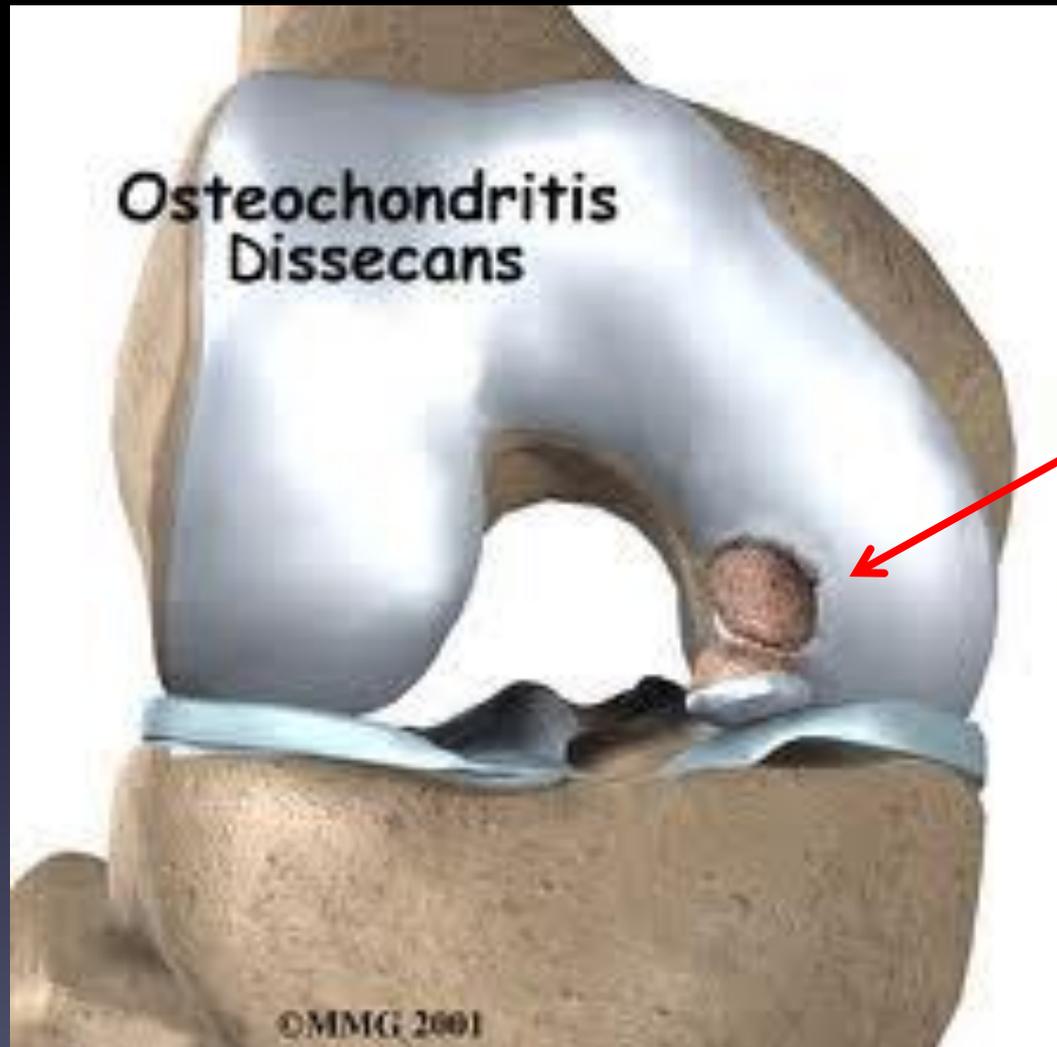


Note increased density (whitiness)
in middle portion of
growth plate and
early OCD

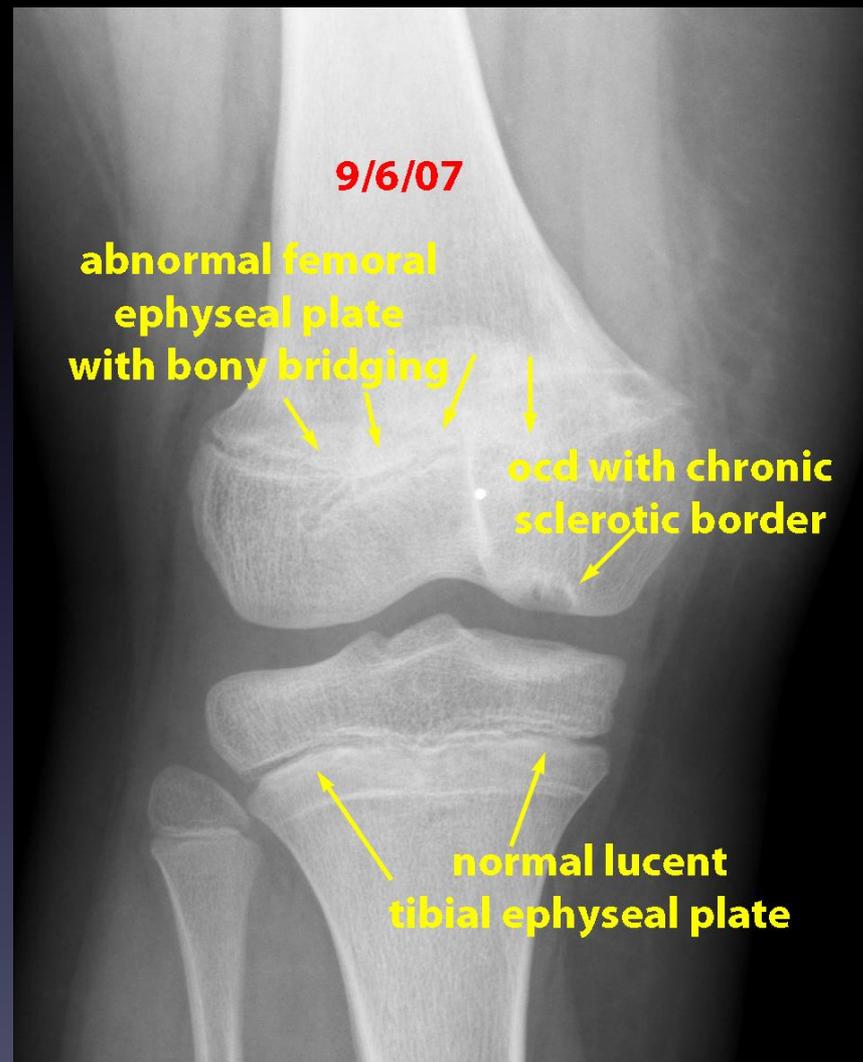
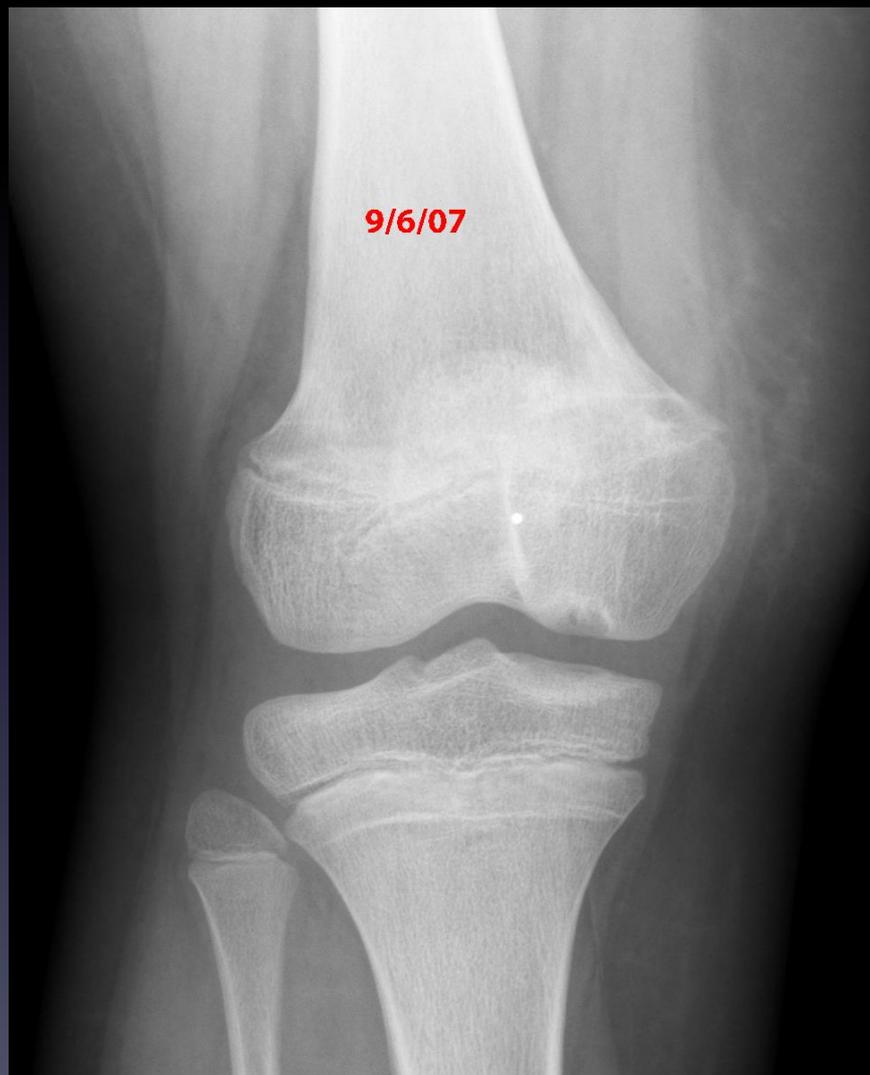
X-ray of 1/3/07 (close up view)



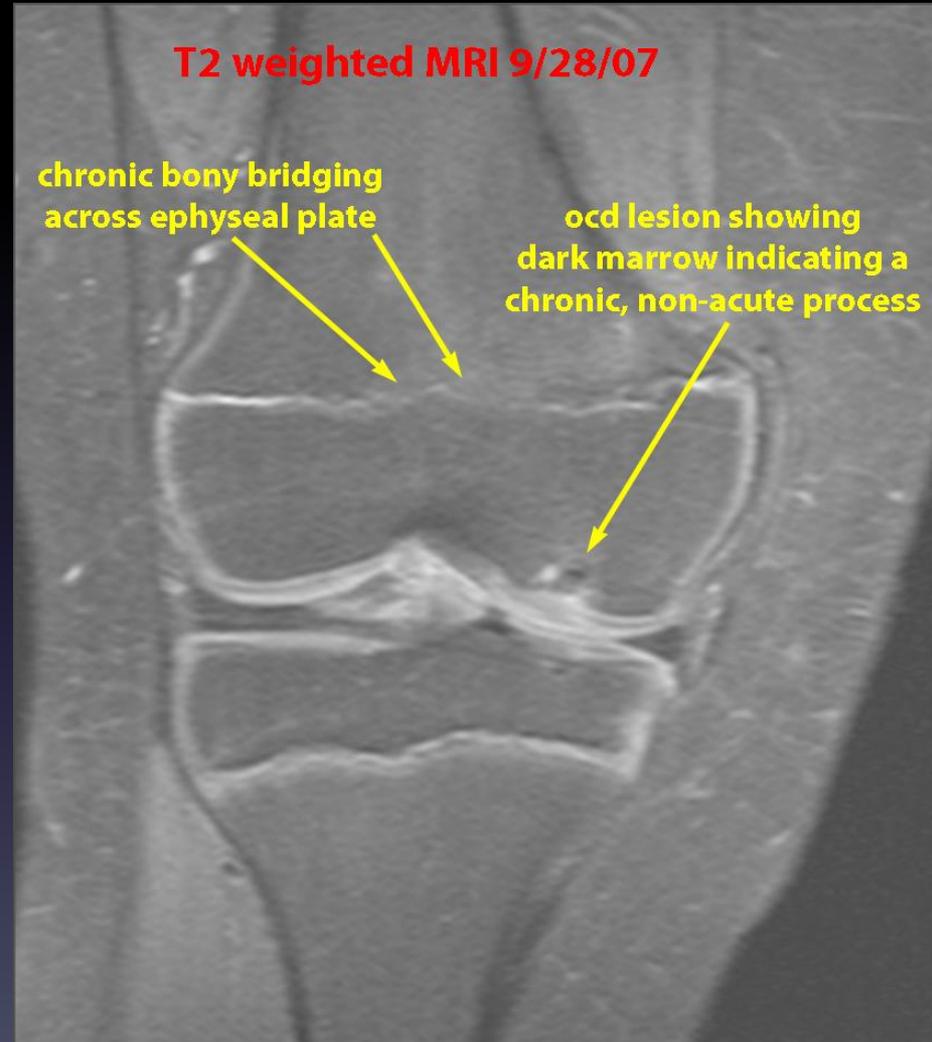
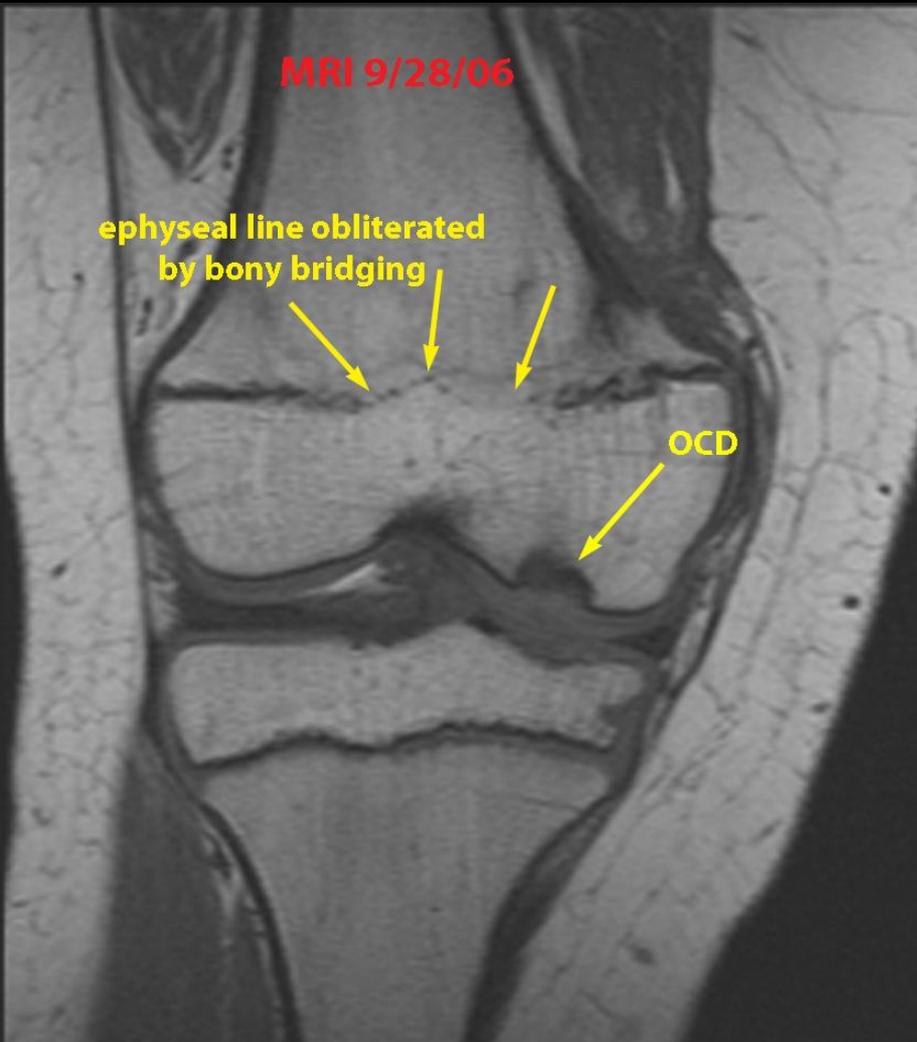
Artist's depiction of an osteochondral defect



X-ray of 9/6/07 immediately after accident #2



MRI of 9/28/07



Conclusions

1. The initial fracture of 9/29/06 resulted in severe disruption of the growth plate.
2. There was evidence of an abnormal growth plate on the 1/3/07 films.
3. There was evidence of a developing osteochondral defect on the 1/3/07 films.
4. The growth plate injury is a separate process from the osteochondral injury.
5. Both the growth plate abnormality and the OCD were more evident on 9/6/07.
6. The MRI showed changes consistent with longstanding growth plate injury and bony bridging, as well as an old OCD injury, that would not have occurred from an event only 3 weeks prior to the exam.

Causality

The primary injury of 9/29/06, not the accident of 9/6/07, was responsible for the ultimate abnormalities involving the growth plate.