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## CLINICAL VIGNETTE

# Lateral Femoral Notch Sign and Its Associations

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An otherwise healthy 21-year-old man presented to urgent care with sudden-onset of right knee pain while jogging. He denies any trauma and reported a “normal” knee radiograph at an outside hospital emergency department and was treated with ibuprofen, crutches, and knee compression bandages. The next day his symptoms recurred within seconds after attempting to ambulate. He also complained of knee buckling and moderate right knee swelling.

Physical examination was remarkable for mild warmth and significant tenderness to palpation over the joint. Range of motion was limited secondary to pain. There was moderate swelling and a ballottable patella. The joint was stable.

Right knee radiographs demonstrated moderate joint effusion with an abnormally deep lateral condylopatellar sulcus with suspected sulcus terminalis impaction fracture. Joint spaces were normal.

### Discussion

It is important for physicians to be aware of the lateral femoral notch sign, and its possible associations with an underlying ACL tear and/or impacted condylopatellar fracture. The lateral condylopatellar sulcus (lateral femoral notch) signifies the junction zone where the tibiofemoral and patellafemoral radii of curvature meet.<sup>1</sup> Normally, the lateral femoral notch represents a shallow groove in the middle of the lateral femoral epicondyle. An abnormally deep lateral condylopatellar sulcus has been associated with underlying pathologies, most notably an underlying anterior cruciate ligament (ACL) tear.<sup>1</sup> Disruption of the ACL may result in abnormal translation of the tibia onto the femur, causing forceful impaction onto one-another. This impaction leads to bone injury, commonly described as “kissing bone contusions.”<sup>2</sup> This mechanism results in an increased depression of the lateral condylopatellar sulcus, known as the lateral femoral notch sign.<sup>1,3</sup> In some instances, such forceful impaction may lead to an osteochondral impaction fracture.<sup>2</sup> Ultimately, an abnormally deep lateral notch sign may also be a harbinger for long-term pathology, including early-onset osteoarthritis.<sup>4</sup>

In 1992, Cobby et. al.<sup>1</sup> sought to quantify and associate the depth of the conylopatellar sulcus with the likelihood of ACL tear. In normal subjects, the mean lateral sulcus depth was 0.45mm, while 0.89mm was found with confirmed ACL tears. No normal subjects had a sulcus depth greater than 1.2mm, and they suggested that 1.5mm (three standard deviations above the

mean) would be a suitable cutoff as a reliable sign for an ACL tear.<sup>1</sup>

This clinical vignette is especially relevant to generalists as other than the well-known association of Segond fractures with an underlying ACL injury, an abnormally deep lateral condylopatellar sulcus on lateral XR may potentially aid in diagnosis and management of patients who present with uncertain findings. Indeed, our patient had “normal radiographs” in the outside ED before presenting to our urgent care. Initial management may vary upon the physician’s suspicion for an ACL tear and/or impaction fracture and whether the joint is stable. Magnetic resonance imaging is useful to discover any underlying ligament pathology or occult fracture, and orthopedic consult should be considered in appropriate patients. Our patient had a stable knee on exam, but given XR findings of a suspected impaction fracture, he was advised to be non-weight bearing on his right knee and to follow-up with orthopedics in 1-2 weeks. Upon his visit to orthopedics clinic, his swelling and pain were improved, and his knee continued to be stable on exam, thus MRI was not warranted at that time. The patient was advised to follow-up as needed if his symptoms did not improve.

### Figures

**Figure 1:** Normal Lateral Knee XR: (Case courtesy of Dr Andrew Dixon, Radiopaedia.org, rID: 36689)



**Figure 2:** Patient's Lateral Knee XR.



## REFERENCES

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