

Radiography for Knee Trauma - Clinical Audit to Ascertain Compliance with the Ottawa Knee Rule

Joseph Dillon-Hearne (Senior Radiographer, King's College Hospital)

Introduction

The knee joint is the largest and most superficial joint in the body. The incongruence of its articular surfaces coupled with its triad of unstable features, (low-position, high mobility, and weight-bearing), mean it is relatively weak mechanically (Moore *et al.* 2010).

In cases of knee trauma patients undergo a series of X-rays to rule out bone injury. However, a retrospective review of 1967 patients showed that, whilst 74% were sent for knee X-rays, only 5.2% of these patients actually had a fracture (Stiell *et al.* 1995).

As a result analysis was undertaken to ascertain clinical indications that positively predicted the presence of knee fractures. Given the eponymous name the 'Ottawa Knee Rules', (OKR) and through subsequent rigorous testing the criteria have been widely adopted (Bullock *et al.* 2003; Empananza & Aginaga 2001; Jalil & Gharebaghi 2010; Stiell *et al.* 1996; The *et al.* 2012).

The National Institute of Clinical Excellence (NICE), British Medical Journal (BMJ Best Practise 2016), and the Royal College of Radiologists (RCR 2012), all endorse the OKR, however NICE also recommend an X-ray if knee swelling occurs following acute trauma.

The Ottawa Knee Rules

- 1) Aged 55 or older
- 2) Isolated tenderness of the patella
- 3) Tenderness of the head of fibula
- 4) Inability to flex 90 degrees
- 5) Inability to weight bear (immediately and upon A&E arrival)

Objectives

- To critically evaluate the literature around the Ottawa Knee Rule (OKR) and its application in clinical practice.
- To assess current practices in regard to compliance with the NICE and RCR guidelines at King's College Hospital n=1248 (initial audit).
- To raise awareness of the Ottawa Knee Rule and subsequently audit to evaluate the effectiveness n=634 (stage 1 intervention).
- To implement a change in the referral process which requires X-ray requests to indicate their Ottawa Knee Rule criteria and evaluate the cumulative results so far n=728 (stage 2 intervention).



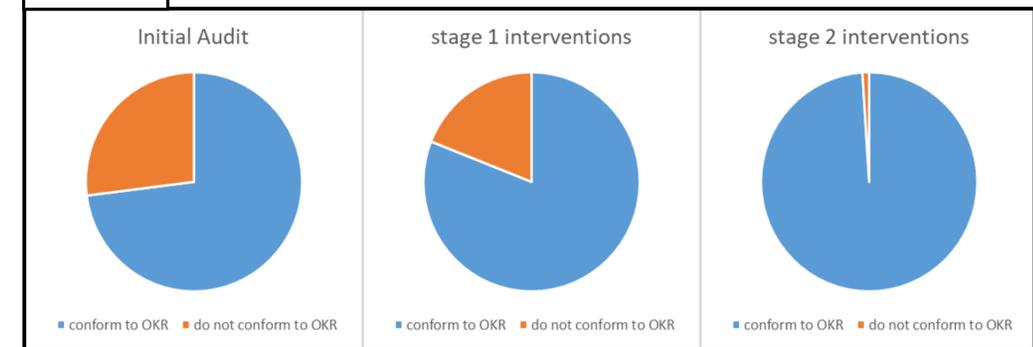
Methodology

Using the Radiology Information System (RIS), A&E X-ray requests from King's College Hospital (KCH) were collected retrospectively and coded to ascertain their conformity with the OKR. This allowed for non-qualifying examinations to be filtered out, the percentage justified under the OKR was then ascertained before the process was repeated twice and re audits performed after each intervention to assess cumulative effectiveness.

Results

- Initial compliance with the OKR was 73%, rising to 81% after stage 1 interventions, and 99% after stage 2 (see image 1).
- Communication of clinical details from referrers to radiology was improved
- The clinical pathway was streamlined, improving usability for end users whilst maintaining flexibility.
- Implementing prompts and converting data points from continuous to discrete makes evaluation simpler.

Image 1



Conclusion

The implementation of the OKR into our clinical practise has aided referrers, radiographers, and reporters in clinical justifying requests for knee X-rays in trauma. By increasing awareness of the rules and actively encouraging their utilisation we can improve patient pathways, reduce unnecessary radiation to patients and prioritise high risk injuries.

In combination, these factors will help reduce pressure on emergency hospital services, a factor outlined in the recent 'NHS Long Term Plan'. as a priority (NHS 2019).

References

- NHS (2019), *The NHS Long Term Plan*. Available at <https://longtermplan.nhs.uk>
- Moore, K., Daley, A. & AMR, A. 2010, *Clinically Orientated Anatomy*, 10th edn, Wolters Kluwer, London, pp.662.
- Stiell, I., Wells, G., McDonnell, I., et al. "Use of radiography in acute knee injuries: need for clinical decision rules", *Acad Emerg Med*, 1995 Nov(2):966-73
- Stiell, I., Greenburg, G., Wells, G., McDowell, I., Cwinn, A., Smith, N., Cacciotti, C. & Sivilotti, M. 1996, "Prospective validation of a decision rule for the use of radiography in acute knee injuries", *JAMA*, vol. 275, no. 8, pp. 611.
- Empananza, J. & Aginaga, J. 2001, "Validation of the Ottawa Knee Rules", *Annals of Emergency Medicine*, vol. 38, no. 4, pp. 364.
- Bulloch, B., Neto, G., Plint, A., Lim, R., Lidman, P., Reed, M., Nijssen-Jordan, C., Tenenbein, M. & Klassen, T. 2003, "Validation of the Ottawa Knee Rule in Children: A Multicentre Study", *Annals of Emergency Medicine*, vol. 42, no. 1, pp. 48.
- The, J., Kambourglu, G. & Newton, J. 2012, "Rational Imaging: Investigation of Acute Knee Injury", *British Medical Journal*, vol. 345, no. 7866, pp. 46.
- Jalil, M. & Gharebaghi, H. 2010, "Validation of the Ottawa Knee Rule in Iran: a prospective study", *Emergency Medicine Journal*, vol. 27, no. 11, pp. 849.