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The Locator: Further clinical experience with a novel PCNL navigation device

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Background: Precise needle puncture of the renal collecting system is an essential step for successful percutaneous nephrolithotomy (PCNL). Puncture is technically challenging and has many pitfalls for the urologic surgeon. We previously described the development of a novel navigation system, the Locator, to assist accurate percutaneous needle placement and now give an update of its clinical utility.

Materials and Methods: The essence of the device is that it stabilizes the needle for PCNL puncture. It relies on an adjustable lockable multidirectional head that is securely fixed to the operating table. The radiolucent head holds a 10F metal guide that allows renal collecting system puncture. The system uses the traditional fluoroscopic "bull's-eye sign" to achieve precise and fixed alignment. Objective in vitro assessment of its ability to reduce time to successful puncture and fluoroscopy screening time has been previously published. We now reviewed our clinical experience over the past 3 years (2009-2011).

Results: The design of the prototype has evolved and is now finalised with the help of a mechanical engineer (JW). The surgical technique for use of the device has been standardised and details are available at: <http://www.urology.uct.ac.za/locator.htm>

The Locator has been used in 54 cases over the past 3 years. It is our subjective experience that the Locator assists with: 1) Improves the efficacy (fluoroscopy and time) of PCNL puncture, 2) allows simpler and faster skills acquisition of PCNL puncture technique by urological trainees.

Limitations of the clinical experience with the Locator include: 1) occasionally the patients ribs prevent puncture into the desired calyx and necessitate reversion to a manual "bull's eye" technique. 2) We have not performed a randomised trial comparing traditional manual and Locator punctures.

Conclusion: The Locator is a simple, cheap, and novel assistant to achieving successful PCNL puncture. It achieves this by stabilizing the needle during puncture. Further clinical experience has supported the preliminary in vitro testing which suggests that the device may reduce fluoroscopy exposure and be quicker. The device warrants further evaluation in the multi-institutional clinical setting.