



## NEW LOCAL SCANNERS TRANSFORM FORENSIC PATHOLOGY



Professor Deon Knobel with the digital scan computer view of his upper torso.

Picture: Chris Bateman

In a groundbreaking world first, full-body digital scanners developed to detect diamonds smuggled off sites by miners are now reducing autopsy X-ray times of gunshot victims from 1 hour to around 35 seconds, and with much greater accuracy, in Cape Town.

Installed and working at laboratories in Salt River near Groote Schuur Hospital and at Tygerberg Hospital by late August last year, the adapted Lodox machines are causing major excitement among the country's forensic experts. Dubbed the 'ForenScan' by staff at the Salt River forensic pathology laboratory, the low-dose radiography equipment is accelerating criminal investigations, enabling fast release of bodies for religious burial, vastly improving worker safety, helping to identify bodies, and allowing the sharing of digital scans across computer networks.

With Cape Town the murder capital of South Africa (Salt River does 15 autopsies per day) the utility of the machines has delighted overworked local pathologists, who led a 4-year

campaign to have the province buy them. *Izindaba* was shown one scan of a body with 27 bullets in it, some of which were lodged deep in bone and 2 of which were of different calibre and 1 with surrounding calcification from age.

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### Fully automated

'The machine, which can be rotated for frontal, oblique and lateral views, can even find old bullets that sometimes unexpectedly crop up, completely unconnected with the cause of death,' said Professor Lorna Martin, head of the University of Cape Town's Department of Forensic Medicine and Toxicology.

She and her predecessor, Professor Deon Knobel,<sup>1</sup> were the chief protagonists in a sustained campaign to obtain the machines after years of working with painfully slow, unwieldy, unreliable, small (15 cm) unclear-view, high X-ray dose, C-arm machines.

Recalls Martin, 'We had to manually position the trolley, risk back injuries, couldn't print the images and often had to repeat images if bullets were elusive. It took at least an hour and often much longer. The timing was sometimes inconvenient, especially with Muslim or after-hour cases. Bodies were often transported to and from Groote Schuur Hospital for better scanning with the undesirable mixing of the dead with the living and accompanying smells.'

The seminal moment came one day in 2003 when a body came back from Groote Schuur with a unique tag and a Lodox scan of the entire body. 'We said this is incredible! What is it? We



Former UCT Department of Forensic Medicine and Toxicology chief, Professor Deon Knobel, risks some low-dose X-rays to illustrate the new machine's capabilities.

Picture: Chris Bateman



Professors Deon Knobel and Lorna Martin, the former and current chief of UCT's Department of Forensic Medicine and Toxicology and Western Cape Health MEC, Pierre Uys, at the ForenScan launch late last year.

Picture: Chris Bateman

had no idea Groote Schuur had such a machine (the trauma unit was testing it after adaptation through collaborative research between DeBeers and UCT's Biomedical Engineering and Radiology departments),' added Martin. Enquiries and animated discussions followed as Red Cross Hospital latched on to the lifesaving value of the machine for their casualty and other departments.<sup>2</sup>

### Specially adapted for forensic work

UCT's Biomedical Engineering Department and Lodox (Pty) Ltd agreed to make further adjustments for density and timing of exposure (to cater for soft-tissue and bone differences in the dead versus the living), and to render the device more durable and waterproof for forensic work.

Eventually the persistent pathology duo got the province to fork out R5.4

million (of the health department's R161 million 'new equipment' 2007 budget) and 2 Lodox machines were purchased specifically for forensic pathology work.

During the media launch of the Salt River machine in early December 2007, Professor Knobel willingly prostrated his head and shoulders on the scanning table while the 13-second scan took place. In a further 20 seconds a crystal-clear skeletal scan appeared on the computer screen (no foreign bodies detected). Western Cape Health MEC, Pierre Uys, said the timing of installation was 'just right with the festive season upon us and more road accidents and violence than usual'.

Martin told *Izindaba* that the Salt River staff (4 specialists supported by registrars and medical officers) handled more than 3 500 cases per year (half of them murders and one-quarter caused by firearms) and were on call '365 days per year'. With a capacity for storing 122 bodies, the Salt River facility has to maintain a large daily autopsy turnover with sufficient discharges to undertakers to prevent overflow. 'We're on call for a week at a time, every 6 weeks, with somebody always on second call, so it's a full-time service,' Martin stressed. She said that on average 5 doctors handled 3 cases each per day.

The Lodox scanner was developed locally by De Beers Mining and is creating a worldwide stir. Already there are 12 USA installations, 1 in Venezuela (with 2 on order), 2 in Sudan, 1 in the United Arab Emirates, 1 in Switzerland, 1 in Thailand, 5 in Cape Town and 1 in Johannesburg. It is, however, the first time the machine has been adapted for a forensic application.

The device can also identify burnt or decomposed bodies, the cause of sudden unexpected deaths such as air embolisms, TB or surgical swabs or



Professor Lorna Martin, chief of UCT's Dept of Forensic Medicine and Toxicology.

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instruments inadvertently left behind (medicolegal). The Western Cape pathology teams have developed a data base and unique administrative system to complement the ForenScan that are now in use at mortuaries throughout the province.

Mrs Vonita Thompson, Director of Forensic Pathology at Salt River, said she had already had 'some SOS calls from other provinces to help them' (with their administrative systems).

1. Knobel GJ, Flash C, Bowie GF. Lodox Statscan proves to be invaluable in forensic medicine. *SAMJ* 2006; 96: 593 - 594.
2. Boffard K, Goosen J, Plani F, Degiannis E, Potgieter H. The use of low-dosage X-ray (Lodox/Statscan) in major trauma: comparison between low-dose X-ray and conventional X-ray. *Journal of Trauma-Injury Infection and Critical Care* 2006; 60: 1175 - 1183.

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