

Locking Plate Fixation for Osteoporotic Femoral Shaft Fractures

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ABSTRACT

Locking plate fixation is a new method of internal fracture fixation. It is designed to act as an internal "external fixator". With the locking of screws in bone as well as on the plate, angular and axial stability is improved. Periosteal circulation is preserved because bone is not compressed against the plate. Therefore, it is advantageous to use this plate in osteoporotic fractures. This case report illustrates the use of the locking plate in femoral shaft fractures in two osteoporotic patients.

INTRODUCTION

Osteoporosis is a very common problem in the elderly. This presents a serious problem to the orthopaedic surgeon. As a result, osteoporotic fractures that are treated surgically often do not do well.

The locking plate had been able to reduce the 'fatigue failure' of the implant-bone interface in elderly osteoporotic patients. Although the locking plate was developed to reduce non-union of fractures in the Less Invasive Stabilization System (LISS), this implant was employed in an open fashion.

RESULTS

Case 1

The first case involved a 78-year-old lady who had a history of diabetes mellitus, dementia and depression. She was independent in her activities of daily living. She was admitted after a fall in the toilet and was found to have a shaft of left femur oblique fracture (Figures 1a-1b). Her bones appeared osteopaenic. She underwent open locking compression plate fixation of the femoral shaft fracture (Figures 1c-1e).

Post-operatively, the patient had a range of motion in the knee of 0-90 degrees. The wound was well healed and check x-rays showed good alignment and healing of the fracture.

Case 2

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Figure 1a. Case 1. AP x-ray. Showing long spiral fracture



Figure 1b. Case 1. Preoperation lateral x-ray

The second case involved a 76-year-old lady who was independent in her activities of daily living and had no co-morbid conditions. She was mopping the floor when she fell and landed on her right thigh. She sustained a spiral fracture of the right femur shaft extending to the supracondylar region (Figures 2a-2c). Her bones also appeared

osteopaenic. She underwent open locking compression plate fixation of her fracture (Figures 2d-2e).

Post-operatively, she was started on non-weight bearing crutches. At 2 months, the patient was asymptomatic and her range of motion in her knee was 0-110 degrees. The patient was not compliant with non-weight bearing.

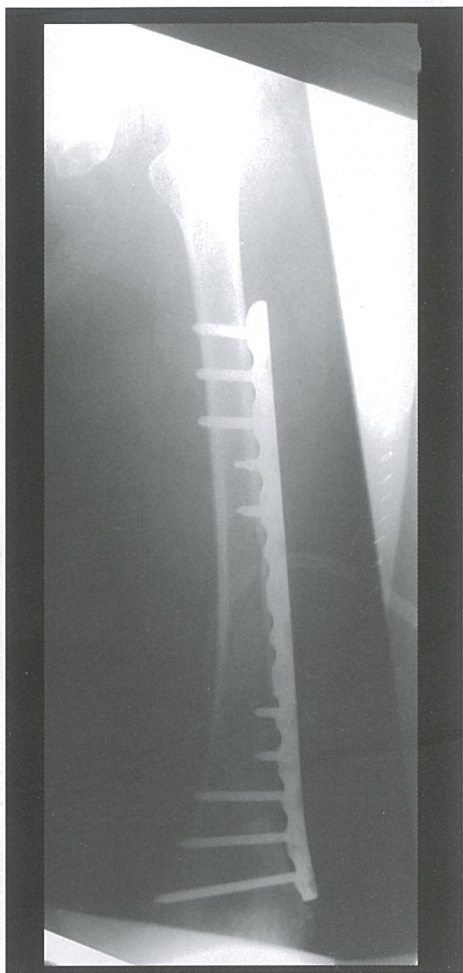


Figure 1c. Case 1. Post-op. AP x-ray



Figure 1d. Case 1. X-ray at review. Reduction maintained.



Figure 1e. Case 1. Callus formation after 2 months.



Figure 2a. Case 2. Pre-op AP femur x-ray



Figure 2b. Case 2. Pre-op lateral x-ray



Figure 2c. Case 2. Pre-op AP knee
Showing supracondylar extension of fracture distally



Figure 2d. Case 2. Post-op AP film.
Note plate is not compressed to bone.

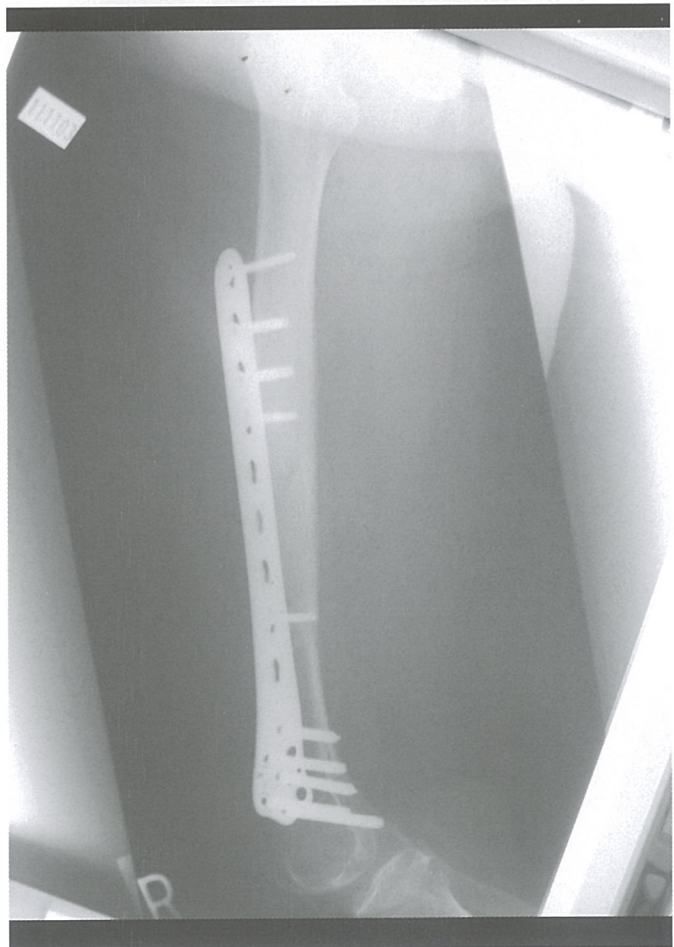


Figure 2e. Case 2. Post-op lateral view

DISCUSSION

The locking compression plate (LCP) was designed to minimise additional soft tissue trauma. It also serves to provide a stable internal fixation with minimal compression of the periosteal blood supply, thus preserving cortical blood circulation. Loss of reduction is minimised, as the plate does not require compression onto the plate. With the locking of the screw in the plate, angular stability and axial stability is provided.

This report serves to illustrate the suitability of the locking plate system for fixation of osteoporotic bone fractures. It had been reported that if the LISS system is used in open fractures, the rate of infection and non-union had been reduced.

The above two cases had the fracture fixed in open surgery, rather than a minimally invasive manner. Both patients showed good fracture alignment and also signs of fracture healing. The fixation was still stable at review. (Figures 1d-1e and 2d-2e)

This serves to illustrate that locking plate fixation can offer a better method of fixation in osteoporotic bone. There have been no large trials in the assessment of this method of fixation, but preliminary results have been promising. The drawback of the new plate system is its high cost.

CONCLUSION

Osteoporotic fractures have been a common management problem faced by orthopaedic surgeons. With the increase in life-expectancy, the problem of osteoporosis will be mounting. This is despite the advances in anti-osteoporosis drugs. The locking compression plate is a new method in the fixation of osteoporotic fractures. The LCP provides good angle and axial stability. The LCP was designed to be used in minimally invasive techniques. However, it should be also considered in osteoporotic fractures.

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