

Comparison Between The Use Of Guided Double-Barrel Drill Sleeve And Standard Single-Barrel Drill Sleeve To Perform Corticotomy

¹Mooi SS, ²Saw A

¹National Orthopaedic Centre of Excellence in Research and Learning (NOCERAL), Department of Orthopaedic Surgery, Faculty of Medicine, University of Malaya, Lembah Pantai, Kuala Lumpur, 50603, Malaysia.

INTRODUCTION:

Percutaneous multiple-drill-holes corticotomy is a technique widely practiced in distraction osteogenesis. This study was conducted to assess the effectiveness of the improved double-barrel drill sleeve of our design compared to the widely used standard single-barrel drill sleeve.

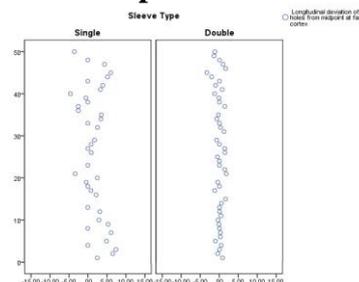
MATERIALS & METHODS:

29 corticotomies were performed using single-barrel drill sleeve and 31 corticotomies were performed using double-barrel drill sleeve. All corticotomies involved linear lengthening of the bones. Healing index was calculated by dividing the external fixation period (day) by the extent of lengthening (cm). Second part of the study involved 10 qualified orthopaedic surgeons to make drill holes on PVC pipes simulating long tubular bones using both drill sleeves. Patterns of the drill holes were studied.

RESULTS:

The mean healing index of double-barrel drill sleeve group was 84.58 and the mean healing index of single-barrel drill sleeve group was 68.05. The difference of the mean was not statistically significant. Simulation drilling time was lower in the double-barrel drill sleeve group compared to single-barrel drill sleeve group (Mean 74 sec vs. 179 sec). Longitudinal deviation of drill holes at the far cortex was significantly lower with the use of double barrel drill sleeve.

Graph 1: Longitudinal deviation of holes from midpoint at far cortex



DISCUSSIONS:

Lower healing index indicates better bone healing and less injury to the surrounding soft tissues. The idea of creating drill holes as linear as possible is to ensure that the corticotomy does not cause an extension of fracture into the pin/wire fixation sites which can cause instability to the construct of the external fixation/lengthening apparatus. If shorter simulation drilling time is translated to shorter real-life operative time, the complication rate can be lowered.

CONCLUSION:

In the simulation study, the time for performing the drilling was much shorter with the use of double-barrel drill sleeve. Longitudinal deviation of drill holes at the far cortex was significantly lower with the use of double barrel drill sleeve.

REFERENCES:

- Frierson, M., Ibrahim, K., Boles, M., Boté, H., & Ganey, T. (1994). Distraction osteogenesis. A comparison of corticotomy techniques. *Clinical Orthopaedics and Related Research*, (301), 19-24.
- Ilizarov, G. A. (1989). The tension-stress effect on the genesis and growth of tissues. Part I. The influence of stability of fixation and soft-tissue preservation. *Clinical Orthopaedics and Related Research*, (238), 249-281.
- Paley, D., & Tetsworth, K. (1991). Percutaneous osteotomies. Osteotome and Gigli saw techniques. *The Orthopedic Clinics of N*
- Yasui, N., Nakase, T., & Kawabata, H. (1999). A technique of percutaneous multidrilling osteotomy for limb lengthening and deformity correction. *Sci*, 5, 104-107.