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IDEAS AND INNOVATIONS

Pediatric/Craniofacial

Lag Screw in Mandibular Plate Technique for Sagittal Splitting Mandibular Fractures

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Summary: Mandibular fractures with sagittal splitting and splaying of both the near and far cortices pose a challenge in their fixation as screws may push the far cortex during screw tightening, resulting in more widening. Screw lagging inside the lower mandibular plate technique may help approximation of the near and far cortices during screw tightening, and this was applied for 4 cases with mandibular fractures. The splaying improved using this technique. Using the screw lagging inside the plate technique may be a safe technique used in mandibular fractures that have cortical splaying. *(Plast Reconstr Surg Glob Open 2019;7:e2255; doi: 10.1097/GOX.0000000000002255; Published online 23 May 2019.)*

INTRODUCTION

Mandibular fractures either combined or single, body or parasymphyseal with sagittal splitting between 2 cortices pose a challenge in their reduction and fixation with acceptable bone alignment. Anatomical reduction of fracture is of utmost importance for fracture healing.[1,2] Splaying of the far and near cortices of the mandible makes the fixation less stable. Sometimes this splaying is exaggerated during screw insertion. Hence, we proposed screw lagging inside a nonlocking plate holes to engage the posterior cortex and compress the two cortices to elude their splaying.

PATIENTS AND METHODS

Four male adult patients suffering from combined parasymphseal and mandibular body fracture (one on each side) with sagittal splitting between the two cortices (Fig. 1) were routinely prepared for open reduction and internal fixation for mandibular fractures with preoperative laboratory and radiological investigations in the form of computerized tomography (CT) facial bones (coronal, axial, and 3D) and panorex views. All patients were examined for occlusion and range of motion.

All patients received general anesthesia with nasal intubation. They underwent routine maxillary mandibular fixation (MMF) as a first step using upper and lower arch bars or MMF screws, then intraoral routine exposure of the fractures was done. Bone was reduced and plates were molded. A 2.3-mm osteosynthesis mandibular plate was placed on the lower mandibular border. The proximal cortex was over-drilled using drill bit with larger caliber (2.0 mm) than usually used (1.8 mm). A drill guide is then

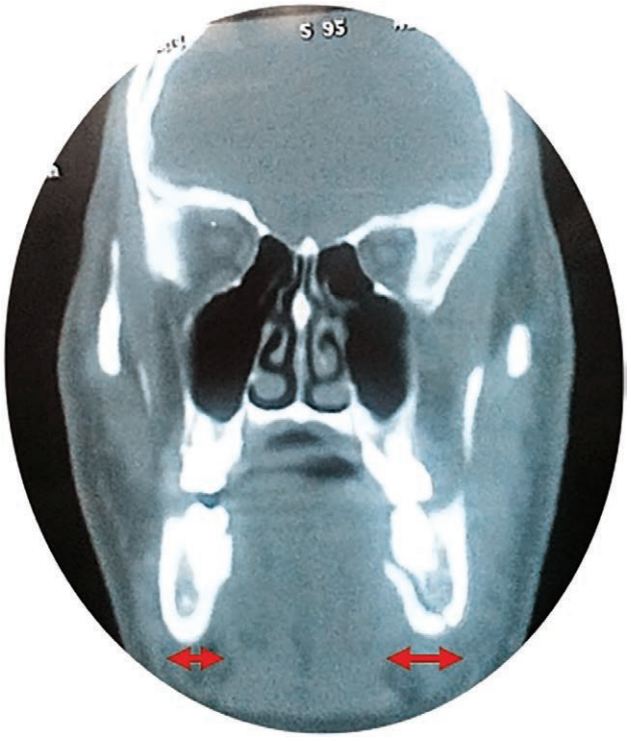

Fig. 1. A 43-year-old man with combined parasymphseal and mandibular body fracture with sagittal splitting and splaying between the near and far mandibular cortices (the red arrow).

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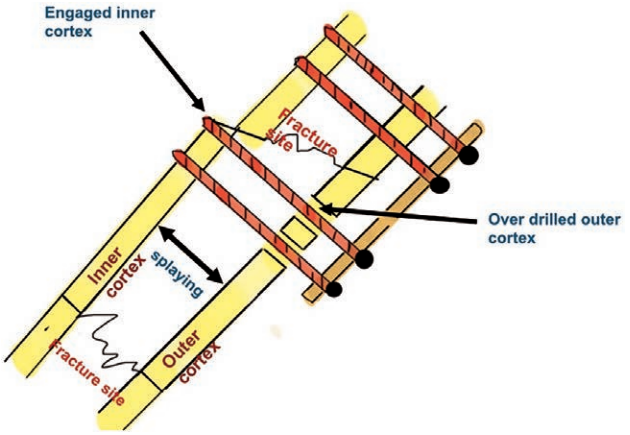

Fig. 2. Drawing shows the technique used with over drilling of the proximal cortex using drill bit 2.0. This allows engagement of the screws in the far cortex only.

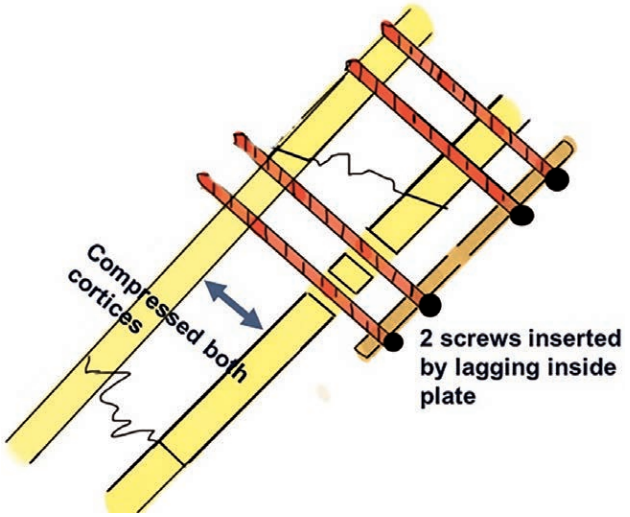

Fig. 3. Drawing shows that with over tightening of the screws the far cortex slides over the screw threads proximally allowing compression of both mandibular cortices causing better bone alignment.

placed through the hole of the proximal cortex and the far cortex is drilled with the usual drill bit (1.8 mm; Fig. 2).

The appropriate screw length was measured by a depth gauge. Tightening of the lag screws over the 2.3 mm plates resulted in compression of the far cortex to become nearer to the proximal cortex, thus providing more acceptable bone alignment and more rigid fixation (Fig. 3). Monocortical 2.0 miniplate was used as tension bands. The patients were evaluated by of CT facial bones (coronal, axial, and 3D) and panorex views on second day postoperatively.

RESULTS

Four adult male patients were included in this study with age range 21–47 years, with combined parasymphseal and mandibular body fracture (one on each side) with cortical sagittal splitting. In those 4 cases both mandibular cortices were found to be in good alignment with no splaying as evidenced by the coronal and axial CT cuts (Fig. 4).

DISCUSSION

Lag screw and mandibular osteosynthesis fixation techniques are well-known techniques for mandibular fractures fixation. The lagging technique was formerly used to treat the symphyseal mandibular fractures[3,4] or mandibular body fracture with sufficient obliquity[5]; however, we proposed to make this fixation more rigid through compression of both near and far mandibular cortices. This was achieved through lagging of the screws itself inside the lower mandibular plate as seen in Figures 1 and 2. Subsequently the far cortex slides over the screw threads proximally allowing compression of both mandibular cortices causing better bone alignment and more rigid fixation.

CONCLUSIONS

The screw lagging in plate technique was a reliable method to avoid splaying of both the near and far mandibular cortices, avoiding more splaying and sagittal splitting.

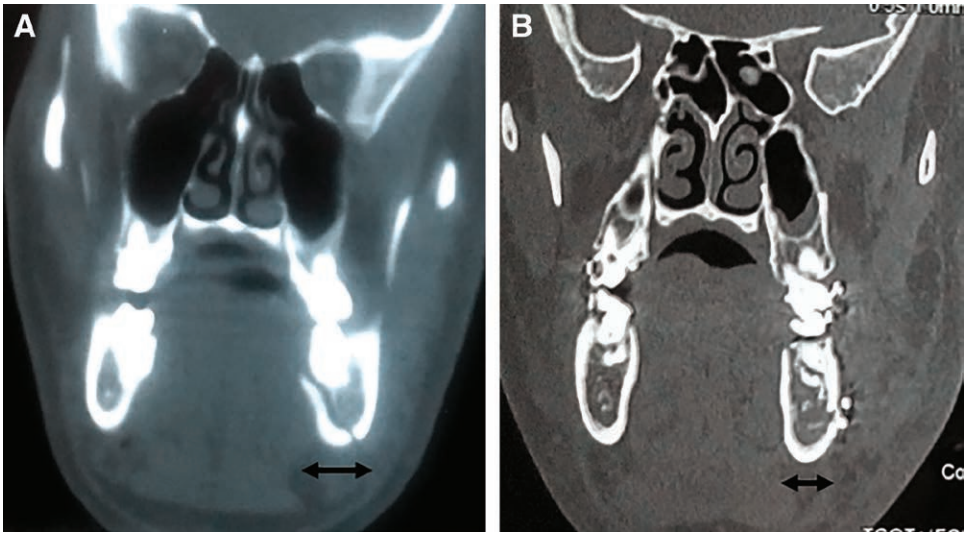

Fig. 4. Pre- (A) and postoperative (B) results for patient with parasymphyseal and body fracture mandible. Both fractures were fixed using the lag inside plate technique with obvious reduction of both cortical splaying.

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