The Use of Wave Shaped Bone Supported Arch Bars in the Treatment of Mandibular Fractures

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Background: Maxillomandibular fixation (MMF) with stainless steel Erich arch bars or intermaxillary screws has traditionally been the cornerstone of the treatment of mandibular fractures. Nonetheless, several well-documented disadvantages persist including intraoperative wire-stick injuries, poor oral hygiene maintenance, and increased operative time [1, 2] Hybrid systems using bone supported arch bars have therefore been proposed as an alternative to address these issues[3, 4]. The newest addition is the Matrix Wave MMF system that features wave-shaped bone supported arch bars with locking screws. This study illustrates our experience with this novel system in the treatment of mandibular fractures.

Methods: Two patients with mandibular fractures were treated with the new Matrix Wave MMF system. The first patient presented with a parasymphyseal fracture on the right side and an angle fracture on the left. The second patient had a nondisplaced right mandibular body fracture and a left ramus and coronoid process fracture. The arch bars were contoured, fitted and secured using 6 mm screws. The malleable arch bar was either stretched or compressed to ensure optimal positioning. 24-gauge interdental fixation wiring was placed using the fish loop technique and transverse 24-gauge wires were fashioned on either side of the fracture to achieve compression and relative fixation about this point.

Results: Patients were retained in MMF until there was stable occlusion and clinical evidence of healing. Oral hygiene was unproblematic and there were no intraoperative wire-stick injuries with insertion of the system. Post-operative Panorex scans did not reveal any evidence of damage to tooth roots. None of the screws became embedded in the mucosa secondary to overgrowth; the arch bars were successfully removed in an outpatient setting without local anesthesia.

Conclusions: The malleability of the bone supported arch bar allows for optimal screw placement and robust compression. Moreover, the self-drilling, locking screws sit above the plate to provide additional anchor points for bridge wires to better approximate fracture segments. In our experience, this novel hybrid system minimizes the drawbacks associated with traditional MMF techniques and offers a viable alternative for closed fixation of mandibular fractures.

References:

1. Coletti, D. P., Salama, A., Caccamese, J. F., Jr. Application of intermaxillary fixation screws in maxillofacial trauma. *Journal of oral and maxillofacial surgery : official journal of the American Association of Oral and Maxillofacial Surgeons* 2007;65:1746-1750.
2. Farber, S. J., Snyder-Warwick, A. K., Skolnick, G. B., Woo, A. S., Patel, K. B. Maxillomandibular Fixation by Plastic Surgeons: Cost Analysis and Utilization of Resources. *Annals of plastic surgery* 2015.
3. Chao, A. H., Hulsen, J. Bone-supported arch bars are associated with comparable outcomes to Erich arch bars in the treatment of mandibular fractures with intermaxillary fixation. *Journal of oral and maxillofacial surgery : official journal of the American Association of Oral and Maxillofacial Surgeons* 2015;73:306-313.
4. Kendrick, D. E., Park, C. M., Fa, J. M., Barber, J. S., Indresano, A. T. Stryker SMARTLock Hybrid Maxillomandibular Fixation System: Clinical Application, Complications, and Radiographic Findings. *Plastic and reconstructive surgery* 2016;137:142e-150e.