

The Results of Membrane-Induced Osteogenesis in Posttraumatic Bone Defects*Jin-Kak Kim, MD¹; Jae-Woo Cho, MD¹; Gi-Ho Moon, MD¹; Do-Hyun Yeo, MD¹;**Beom-Soo Kim, MD¹; Jong-Keon Oh, MD, PhD¹; Won-Seok Choi, MD**¹Guro Hospital, Korea University Medical Center, Seoul, SOUTH KOREA*

Purpose: It is absolutely challenging to treat posttraumatic bone defects surgically. Masquelet has reported that membrane-induced 2-step operation can accelerate osteogenesis in the zone with bone defects. We are performing membrane-induced osteogenesis for patients suffering from posttraumatic bone defects. Here, we are going to analyze the results of their treatment and also the effects of the operation.

Methods: From January 2014 until June 2016, among the patients having bone defects for a resection done in the process of getting treatment for posttraumatic osteomyelitis, we selected 54 subjects who had received treatment with membrane-induced osteogenesis and had been observed for over 1 year. Here, retrograde analysis was conducted. We cultured the tissue before removing the dead tissue from the zone with bone defects or debriding the tissue infected for osteomyelitis, and then, we cultured the tissue again after the debridement in order to evaluate the appropriateness of the treatment. We filled the antibiotic-loaded cement spacer in the zone with bone defects to form an induced membrane and repeated the debridement until the tissue culture was found to be negative. After treating the infection clinically, we operated the bone graft.

Results: During the 2 years of study, 54 patients were bone grafted and average bone defect was 82 mm. Tibia shaft cases were most common as 19 cases and second was femur shaft cases. 37 cases presented single organism on cultural study, most common was methicillin-resistant *Staphylococcus aureus* (MRSA) for 11 cases followed by *Pseudomonas* for 7 cases. 6 cases presented multiple organisms. Most common was MRSA for 4 cases, when calculating each microorganism individually. 11 cases showed no organism at all. In total, MRSA was 25% of all cases and no organism was second most common with 18% rate. Bone union without infection recurrence were 47 cases, and 1 of the cases showed donor site infection. Infection recurrence occurred at 7 cases, 4 among them were cured with revision surgery, 2 are being treated, and only 1 case ended up amputation of lower extremity. None of the cases showed same culture result compared to previous original organism. Primary success rate was 87% and secondary 94.4%.

Conclusion: Three-stage induced-membrane technique can be a good choice for treatment of bone defect due to posttraumatic osteomyelitis. It is also useful for treating bone defects accompanied with infection.