

## The Power of a Swab: Can Preoperative Nasal Culture Predict Complications or Outcomes Following Repair of Fracture Nonunion?

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**Background/Purpose:** Much has been published about the risks for infection and the surgical complications associated with patients who carry *Staphylococcus aureus*. The purpose of this study is to determine if nasal swabbing for methicillin-resistant *S. aureus* (MRSA) and methicillin-sensitive *S. aureus* (MSSA) bacterial carriage can predict operating room culture, function, and/or outcome after fracture nonunion surgery.

**Methods:** 62 patients undergoing surgery for fracture nonunion were prospectively followed. Prior to intervention, patients were nasally swabbed for carriage of MRSA and MSSA and subsequently treated by an orthopaedic surgeon blind to carrier status. Preoperative lab data and length of hospital stay (LOS) at the time of surgery were documented. Data analyses were performed using grouped MRSA and MSSA carriers (*Staphylococcus* carriers [SCs]) versus noncarriers. Patient follow-up was performed at regular intervals to evaluate for wound complications including culture of *S. aureus*, antibiotic usage, pain, and Short Musculoskeletal Function Assessment (SMFA) scores. Outcomes analyzed also included time to healing, need for additional surgery, and persistent mal/nonunion.

**Results:** The nonunion sample included tibia, femur, humerus, clavicle, and forearm fractures. 26% of patients were identified as MSSA carriers while an additional 6.5% carried MRSA. Average preoperative white blood cell counts, ESR (erythrocyte sedimentation rate) and CRP (C-reactive protein) values did not differ between SCs and noncarriers. Hospital LOS was similar between groups. Carriers were just as likely as noncarriers to culture positively for any pathogen at the time of surgical intervention. However, SCs were three times as likely as noncarriers to grow *S. aureus* (14.3% vs 4.7%;  $P = 0.3$ ). Postoperative wound complications, antibiotic use, pain at follow-up, and progression to healing did not differ between groups. Mean time to healing was similar at 6.1 ( $\pm 3.5$ ) months among SCs and 6.4 ( $\pm 4.5$ ) months among noncarriers. Postoperative follow-up of at least 12 months was available on 91% of patients. Functional scores were significantly worse in SCs at 3 months (SMFA indices of function, bothersome, emotion, and mobility;  $P = 0.02$ ) with significantly worse mobility reported at 6 and 12 months ( $P < 0.05$ ).

**Conclusion:** Preoperative nasal swabbing for *S. aureus* is a simple and noninvasive diagnostic tool with significant prognostic implications in patients undergoing fracture nonunion surgery. This study demonstrated poorer postoperative functional outcomes in patients who carried MRSA or MSSA with sustained losses in mobility up to a year after nonunion surgery. Identification of patients at risk for developing postoperative complications has significant implications for HCAHPS (Hospital Consumer Assessment of Healthcare Providers and Systems) scores and health-care quality metrics.