

EP-015

비골 골절의 비관혈적 정복술에서  
무선 휴대용 초음파의 임상적 타당성:  
고사양 탐촉자와의 비교 연구

(Clinical Feasibility of Wireless Handheld  
Ultrasound in Closed Reduction of Nasal  
Bone Fractures: A Comparative Study with  
High-End Probes)



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**Purpose :** Ultrasound-guided closed reduction allows for real-time visualization of fracture segments, overcoming blind palpation limitations. However, standard probes vary in adaptability. This study evaluates the clinical efficiency of a wireless handheld ultrasound device (V-scan) compared with high-end Linear and Hockey stick probes.

**Methods:** We retrospectively reviewed 160 patients with nasal bone fractures treated between January 2024 and January 2026. Surgeries were performed by four experienced plastic surgeons. Patients were categorized into Group H (Hockey stick, 8-18 MHz), Group L (Linear, 3-12 MHz), and Group V (V-scan Air, 3-12 MHz) (Fig. 1). We compared radiologic accuracy (residual depression and deviation), intraoperative visibility, surgical convenience, and operative time.

**Results:** aseline characteristics were balanced. Postoperative residual depression ( $p=0.294$ ) and deviation angle ( $p=0.139$ ) showed no significant differences. Reduction accuracy was comparable even in complex fractures ( $p=0.198$ ). Qualitatively, Group H achieved the highest visibility score (4.79,  $p<0.001$ ). However, Group V demonstrated the highest surgical convenience (4.73) and shortest operative times (20.7 min) ( $p<0.001$ ) (Fig. 2). No significant complications were observed at the 6-month follow-up.

**Conclusion:** The wireless handheld device demonstrated clinical outcomes comparable to high-end probes. While the Hockey stick offers superior image clarity (Fig. 3), the V-scan provides adequate visualization with superior workflow efficiency (Fig. 4), making it a viable tool for nasal fracture management.

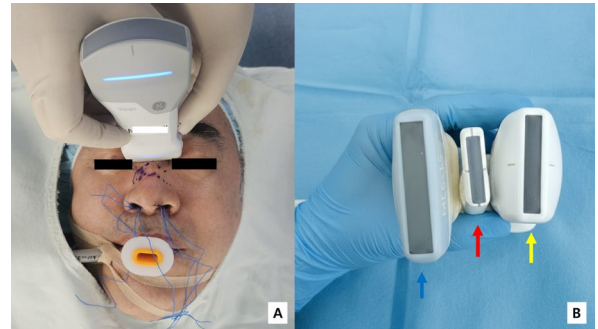


Fig 1. (A) Usage of the wireless V-scan Air during closed reduction. (B) The three probes used: Linear (blue arrow), Hockey stick (red arrow), and V-scan Air (yellow arrow).

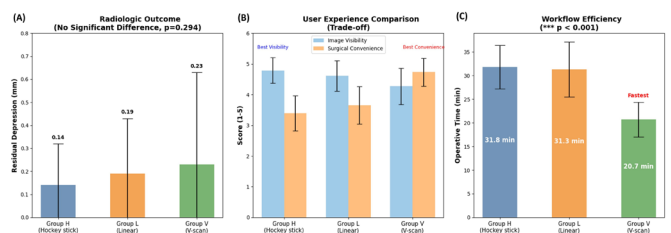


Fig 2. (A) Comparison of radiologic results showing no significant difference. (B) User experience scores favoring Group H for visibility and Group V for convenience. (C) Operative time, highlighting the significant efficiency of the V-scan group.

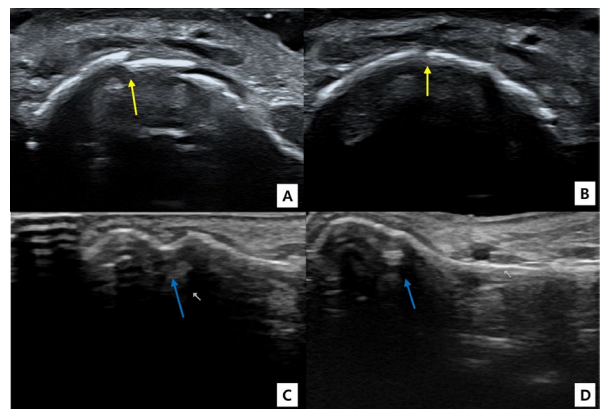


Fig 3. (A, B) Images obtained with the Hockey stick probe (Group H). (C, D) Images obtained with the Linear probe (Group L), both demonstrating successful reduction.

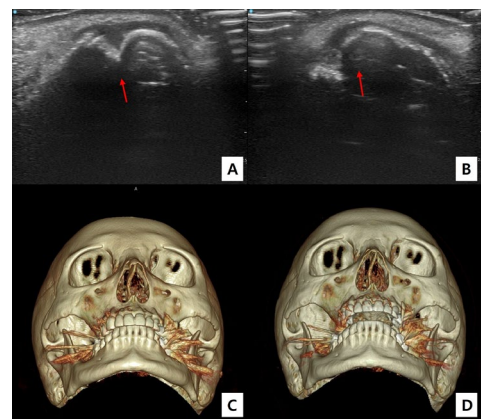


Fig 4. Representative case using the wireless V-scan. (A, B) Pre- and postoperative ultrasound images guiding the reduction. (C, D) Corresponding pre- and postoperative CT scans confirming accurate alignment.