

# Single energy metal artifact reduction performs better than virtual monoenergetic dual-energy reconstruction in CT of the equine proximal phalanx

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## Products

Computed Tomography (CT) for metal artifact reduction in equine imaging

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## Clinical Background

Metal artifacts in CT imaging interfere with accurate assessment of surgical implants and surrounding tissues. CT with advanced artifact reduction techniques significantly improves diagnostic precision, allowing for better post-operative monitoring and earlier detection of complications.

## Aim of Study

Evaluate the effectiveness of single-energy metal artifact reduction (SEMAR™) and virtual monoenergetic (VM) dual-energy CT (DECT) in reducing artifacts from stainless steel surgical implants in equine limbs.

## Cohort Study

CT imaging was performed on 18 equine cadaver limbs with surgically inserted stainless steel screws, using a Canon Aquilion One Vision scanner. Seven different CT acquisition techniques were compared, and images were analyzed by blinded reviewers for artifact severity and clinical usability.

[Link to paper](#)

## Results

- **Helical + SEMAR and Volume + SEMAR significantly outperformed all other methods** in metal artifact reduction, especially in adjacent tissues ( $P < 0.001$ ).
- **VM DECT at 135 keV was the best monoenergetic reconstruction**, though still inferior to SEMAR.
- **Standard Helical and Standard Volume had the worst artifact reduction performance.**
- **Objective evaluation confirmed SEMAR's accuracy in reducing blooming artifact**, with **Helical + SEMAR, Volume + SEMAR, and VM DECT 120 keV** performing best in accurate screw width measurement.
- **No significant difference between Helical + SEMAR and Volume + SEMAR**, making both superior options for reducing artifacts.

## Summary

- **SEMAR significantly reduces metal artifacts**, outperforming VM DECT in both subjective and objective assessments.
- **Helical + SEMAR and Volume + SEMAR are the most effective techniques**, reducing blooming artifacts while maintaining diagnostic accuracy.
- **VM DECT at 135 keV provides moderate artifact reduction**, but remains less effective than SEMAR-based acquisitions.
- **CT with SEMAR should be prioritized in equine orthopedic imaging** for better visualization of implants and surrounding tissues, aiding in more accurate diagnoses and treatment planning.