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HEALING FROM THE HEEL : GAENSLEN'S APPROACH IN CHRONIC CALCANEAL OSTEOMYELITIS-A SURGICAL REVIVAL

Orthopaedics

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ABSTRACT

Background: Chronic calcaneal osteomyelitis is a therapeutic challenge due to complex anatomy, poor vascularity, and high load-bearing function. Gaenslen's posterior midline approach offers a direct route for thorough debridement with minimal soft tissue compromise. This study evaluates the clinical efficacy, surgical outcomes, and complications associated with the use of Gaenslen's window in treating chronic calcaneal osteomyelitis. **Methods:** In a prospective study spanning 14 months, 22 patients (aged 18–65) with culture-proven chronic calcaneal osteomyelitis underwent surgical debridement using Gaenslen's window. Detailed preoperative planning, intraoperative technique, and postoperative care were standardized. Outcomes evaluated included infection resolution (clinical and biochemical), radiological bone healing, wound healing time, recurrence rate, need for reoperation, and functional status using AOFAS hindfoot score.

Results:
- Infection resolution achieved in 90.9% (20/22) patients.
- Average wound healing time was 4.9 weeks.
- Mean AOFAS hindfoot score improved from 41.6 ± 7.4 pre-op to 84.3 ± 5.8 at 6 months.
- Recurrence noted in 2 cases, both managed with repeat debridement.
- Gait restoration and independent ambulation achieved in all except one patient requiring walking aid.
- No major soft tissue or neurovascular complications reported.

Conclusion: Gaenslen's approach remains an effective, limb-salvaging, and anatomically favorable method for managing chronic osteomyelitis of the calcaneum. It allows direct access for thorough debridement, localized antibiotic delivery, and functional restoration with minimal morbidity.

KEYWORDS

INTRODUCTION

Chronic osteomyelitis of the calcaneum, though less common than forefoot infections, is a disabling condition. The calcaneum's limited vascularity and essential weight-bearing role complicate management. Infection often follows trauma, surgery, diabetic ulcers, or hematogenous spread, and may progress to sequestration or sinus formation.

Treatment hinges on thorough surgical debridement, but standard posterior or lateral approaches may compromise overlying soft tissue or result in dead space, increasing recurrence risk. The Gaenslen midline posterior approach provides a central, extensile exposure of the calcaneum through a sagittal split, facilitating comprehensive debridement while preserving soft tissue integrity.

This study assesses the outcomes of Gaenslen's approach in treating chronic calcaneal osteomyelitis, emphasizing surgical detail, outcomes, and functional recovery.

MATERIALS AND METHODS

Study Design: Prospective interventional study (tertiary care center), jhalawar medical college
Duration: 14 months April 2024 to June 2025
Patients: 22 (16 males, 6 females)
Age Range: 18–65 years (mean 43.2 years)

Inclusion Criteria
- Chronic calcaneal osteomyelitis (>6 weeks duration)
- Radiological evidence (X-ray/MRI) of osteomyelitis
- Positive cultures or sinus tract with purulent discharge
- Failed conservative management

Exclusion Criteria
- Active systemic infection or sepsis
- Severe peripheral arterial disease
- Charcot neuroarthropathy
- Prior major heel surgery or partial foot amputation

Preoperative Evaluation
- X-ray of foot (lateral and axial views) to localize bone destruction/sequestra
- MRI for soft tissue and sinus tract delineation
- ESR, CRP, CBC
- Culture & sensitivity (deep swab or sinus tract aspiration)
- Foot pressure mapping in selected cases

Surgical Technique
Anesthesia & Positioning:
- Regional (spinal) or general anesthesia
- Patient prone with tourniquet control

Incision:
- Midline longitudinal incision (~6–8 cm) made on posterior heel, splitting Achilles insertion if necessary.
- Soft tissue dissected to expose posterior surface of calcaneum.

Creating the Gaenslen Window:
- A sagittal split osteotomy of the calcaneus was performed using an oscillating saw or osteotome.
- The split extended from posterosuperior angle toward the plantar aspect.
- Bone flaps were gently distracted to expose medullary cavity and sequestered tissue

Debridement:
- All necrotic bone, fibrous granulation tissue, sinus tracts, and sequestra were removed.
- High-speed burr used for sclerotic margins.
- Lavage with 6–9 liters of saline mixed with povidone iodine or gentamicin

Local Antibiotic Application:
- Calcium sulfate beads loaded with vancomycin or gentamicin were packed into cavity.
- In 6 patients, platelet-rich fibrin (PRF) was used to promote healing

Closure Options:
- Primary closure over suction drain (n=12).
- Secondary intention with NPWT dressing (n=8).
- Split skin graft (n=2) for delayed closure

Postoperative Protocol:
- IV antibiotics for 2 weeks based on sensitivity.
- Non-weight bearing for 6 weeks.
- Wound inspection on day 2, drain removal day 3–5
- Oral antibiotics for 4–6 weeks.
- Progressive weight-bearing at 6–8 weeks with customized insole

RESULTS

Variable	Result
Mean duration of symptoms	8.3 weeks
Culture positivity	21/22 (95.4%)
Common organisms	Staph aureus (71%), Pseudomonas (14%), MRSA (9%)
Mean operative time	94 minutes (range 70–130)
Mean healing time (wound closure)	4.9 weeks
Recurrence of infection	2 cases (re-debrided successfully)
Sinus resolution	All sinuses closed within 6 weeks
Functional ambulation achieved	21/22 (95.4%) patients
AOFAS Score (Pre-op)	41.6 ± 7.4
AOFAS Score (6 months Post-op)	84.3 ± 5.8

Complications

- Superficial wound edge necrosis (n=1) – healed conservatively
- Delayed wound healing >6 weeks (n=2)
- Mild heel pad atrophy (n=3) – managed with orthotic cushion
- No neurovascular injury, no major flap necrosis, no amputation

DISCUSSION

Gaenslen's technique permits unparalleled access to the infected calcaneus without compromising lateral or plantar soft tissues. The sagittal split allows for effective debridement under vision, which is often limited in posterior or lateral approaches.

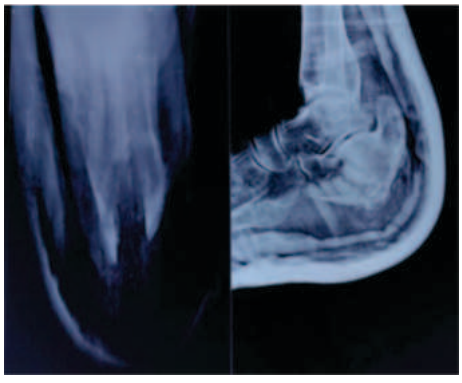
High infection clearance (90.9%) and low recurrence (9%) validate its utility. AOFAS scores showed marked improvement in mobility and pain relief. Functional independence was preserved in all but one patient.

Unlike aggressive resection or partial calcanectomy, this approach preserves heel height and shape, crucial for gait and footwear compatibility. Additionally, incorporating local antibiotic beads reduces systemic toxicity and promotes high local antibiotic levels.

CONCLUSION

Gaenslen's window is a highly effective and anatomically favorable technique in managing chronic calcaneal osteomyelitis. With meticulous surgical execution and structured postoperative care, it offers a reliable limb-salvage alternative with excellent infection control and functional outcomes.

Pre Operative X Ray



Post Operative X-ray

Pre Operative Clinical Picture

Intra Op Clinical Picture

Gaenslen Approach

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