Total ankle arthroplasties are typically reserved for patients who are older than 60 years old with low physical demand that have debilitating arthritis and have generally not been recommended for use in younger, mobile patients. However, recent literature suggests that with technology advances, they might be considered an effective treatment option.

A 20 year old male with a trimalleolar fracture underwent a failed ORIF overseas. Poor reduction with cerclage wire led to an arthritic, painful ankle. Patient had several consults recommending an ankle fusion, but refused due to fear of loss of mobility leading to forced early retirement. At the age of 38, the patient received a 3D printed ankle implant preserving function, allowing him to continue working as a car mechanic.

Following arthroplasty, the patient now experiences no pain and has retained his quality of life.

In support of recent literature, this case suggests that total ankle arthroplasties should have more consideration as an efficacious treatment option in younger patients contrary to previous beliefs that they are to be reserved for older, less mobile populations. Ankle arthroplasties preserve function and decrease the likelihood of lifestyle changes. However, future studies are needed to further support the use of total ankle arthroplasty in younger patients. Innovative technology is leading to improvements in prosthetic designs and, subsequently, better outcomes with arthroplasties than previously noted in past studies even amongst younger patient populations.
Navigating Complexity: A Comprehensive Case Study on Successfully Resolving Multi-Tibial Fractures Complicated by Osteomyelitis

This case study delves into the experience of a 30-year-old male patient who sought medical attention after a motorcycle accident. His complex social history includes being a chronic smoker and an intolerance to pain medication. He arrived with a mid-tibial fracture in his right leg and encountered persistent pain after undergoing an open reduction and internal fixation (ORIF) procedure coupled with external fixation. Radiological assessment of X-rays revealed the complexity of the injury.

His injury was classified as a Gustilo type IIIB fracture. Subsequently, the patient faced complications related to infected hardware, confirmed by pathology results that unequivocally identified osteomyelitis within the bone. The management of post-traumatic osteomyelitis typically involves bone biopsy, soft tissue assessment, and aggressive debridement. Open tibial fractures historically pose a significantly increased risk of complications and are among the most frequently occurring long bone fractures. These complications can range from infection to malunion, non-unions, compartment syndrome, and nerve injuries. Studies have indicated a substantial correlation between higher Gustilo grades and an increased risk of postoperative complications (Lua, 2017). Due to delayed wound healing, the patient was subsequently referred to orthopedic and infectious disease specialists, ultimately necessitating the insertion of an intramedullary (IM) nail to stabilize the fracture.

In summary, this complex case highlights multidisciplinary management of open tibia fractures complicated by osteomyelitis. Thorough radiographic, pathologic, and clinical assessments informed treatment decisions. Despite complications, patient-centered care yielded a successful outcome. Adhering to evidence-based protocols can optimize recovery even with elevated risks.

Authors/Financial Disclosures

Disclosures selected: I/We have nothing to disclose

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African-Americans (AA) are more likely to have extensive surgical scars compared to non-AAs. Arthrofibrosis after total ankle arthroplasty (TAA) is a stiffening of the ankle joint with associated pain and loss of range of motion. It is our observation that the pathology is more common among AAs, potentially due to the similar mechanism of surgical scar formation. The purpose of this study is to investigate the relationship between the AA race and the occurrence of arthrofibrosis after TAA.

The patients who underwent TAA with at least 12 months of follow-up between 2016-2020 were identified. The occurrence of arthroscopic debridement of the ankle joint post-TAA was recorded and compared between AA vs. non-AA groups with odds ratio and chi-square test. "Arthrofibrosis requiring arthroscopic debridement" was defined as a painful stiff joint of < 5 degrees of dorsiflexion at the ankle, which did not improve with physical therapy. The p-value of < 0.05 was considered statistically significant.

Sixty-three patients were identified and included in the study (mean follow-up = 218 weeks, range = 52 – 344 weeks). Of those, 14 patients underwent arthroscopic debridement of arthrofibrosis post-TAA. The incidence was higher in the AA (50%) vs. non-AA (14%) groups (OR = 6.1, p = 0.004).

African Americans were 6 times as likely to have arthrofibrosis requiring surgery. Further studies with a larger sample are needed to evaluate other risk factors, also associated with AA race. We recommend that AA patients are notified about this phenomenon prior to TAA.
Which Metatarsals in Metatarsus Adductus Contribute to Deformity?: Comparative Radiographic Assessment and Implications on Surgical Management

Purpose
Surgical treatment for hallux valgus with concomitant metatarsus adductus (MA) deformity typically corrects the first ray only. While some new literature reports improved outcomes with additional correction of metatarsals two and three, the correction does not address all lesser metatarsals. This retrospective comparative investigation seeks to collect quantitative measurements of radiographic parameters of MA to determine deformity of individual metatarsals.

Methodology
Seventy-five patients meeting selection criteria were analyzed based on dorsoplantar radiographs and clinical demographics. Inclusion criteria included patients aged 18-80, weight-bearing radiographs, and no prior history of foot/ankle surgical intervention, fracture, or Charcot neuroarthropathy. The effective MA angle for each lesser metatarsal was measured relative to a true midfoot bisector. Data were considered in terms of the mean, standard deviation, and range and analyzed with ANOVA and Tukey’s post-hoc analyses.

Results
The mean MA angles measured 22.35±6.09 degrees, 21.07±6.06 degrees, 15.84±5.99 degrees, and 8.96±5.45 degrees for metatarsals 2-5, respectively. ANOVA testing demonstrated statistical significance (p<0.00) between all groups. Further post-hoc analysis indicates adduction of the second and third metatarsals are effectively equal (p=0.546); however, statistically significantly different than adduction of metatarsals 4 and 5 (p<0.000).

Discussions
The results of this study indicate that all metatarsals are not adducted uniformly. When evaluating MA, it might be reasonable to conclude that metatarsals two and three are effectively the same regarding deformity, whereas four and five warrant independent evaluation. When extrapolating this data to surgical decision-making, consideration could be given to correcting only metatarsals two and three.

Format
Scientific
Evaluating Commercially Available Artificial-Intelligence Chatbot Accuracy in Identifying Hallux Abducto Valgus Deformity and Providing Surgical Recommendations: A Comparative Study

Submit Date 11/15/2023

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Purpose To evaluate the effectiveness of a commercially available language model-based AI chatbot in identifying hallux abducto valgus (HAV) from DP view foot X-rays and providing surgical recommendations, assessing its potential in clinical decision-making and their reliability compared to human experts in the field of podiatric surgery.

Methodology Fifty DP foot X-rays with HAV deformity from 47 adult patients were analyzed by AI for presence of HAV deformity and surgical procedures recommendations were made based on previously calculated true IM, HA and HI angles. A custom-made grading system was established and used by a board-certified podiatrist to evaluate AI's accuracy in choosing the most appropriate procedure.

Results HAV deformity in 42/50 x-rays were identified, yielding a diagnostic accuracy of 84% (n=50) and a 16% misdiagnosis rate (n=50). This AI Program provided reasonable surgical procedures for all 50 DP foot x-rays based on traditional 2-D evaluation of DP x-rays.

Discussions The study's findings reveal that while this AI program recognized the majority of HAV deformities, its 16% misdiagnosis rate and inability to calculate angles from the X-rays are limitations. The AI also did not take into consideration findings such as degenerative joint disease or abnormal metatarsal parabola. We concluded that this AI program cannot replace human expertise in identifying HAV deformities and surgical planning. Nevertheless, it’s undeniable that AI is a great supplementary tool for health professionals and students. Future research should aim to improve AI accuracy and reliability and explore its application in more complex medical scenarios.

Format Scientific

Classification Forefoot Reconstruction

Level of Evidence Level II

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Purpose

Diabetes impacts a quarter of the patient population in the Veterans Affairs (VA) Health Care System. Notably, one-fourth of individuals diagnosed with diabetes develop diabetic foot ulcers (DFU) placing these patients at an elevated risk of amputation. This study is to evaluate the racial differences in DFU-related amputations at the VA using Million Veterans Program (MVP) participants.

Methodology

Data was obtained from the MVP database from 2011-2023 using ICD-10 and CPT procedure codes sampling 849,644 veterans. A cohort of 13,562 veterans 18 years and older with DFU diagnosis (Dx Z86.31) were evaluated. The cohort was further assessed by the level of amputation: toe-interphalangeal joint (CPT 28825), foot-transmetatarsal (CPT 28805), and foot-midtarsal (CPT 28800).

Results

Our cohort was composed of 73.41% White, 18.58% Black, 0.42% Asian, 3.35% American Indian/Alaskan Native, 0.63% Native Hawaiian/Pacific Islander, 1.74% Other, 1.87% Unknown. The Black veteran population made up 15.33% of all toe amputations yet 23.54% of all foot-transmetatarsal and 30.43% of foot-midtarsal amputations.

Discussions

The origins of racial disparities at the VA are likely complex and multifaceted. There was a noticeable increase in Black veterans requiring proximal amputations (foot-transmetatarsal and foot-midtarsal) compared to that of the other races. Additional research is necessary to determine how other factors such as hyperglycemia, hypertension, peripheral arterial disease, and obesity affect DFU-related amputations at the VA.
Incidence of Floating Toe with Weil Osteotomy: A Systematic Review

This study aims at reevaluating the current incidence of floating toe compared to the previously reported rate of 36% by Highlander in 2011.

Following PRISMA guidelines, a systematic review was conducted from 2012 using PubMed, SCOPUS, and Cochrane Library utilizing keywords. Inclusion criteria encompassed individuals aged 18+, excluding certain conditions and prior surgeries. This yielded 2258 articles, refined to 782 unique articles for analysis. Nine articles were selected for analysis including Weil osteotomy, floating toe incidence, adjunctive procedures, and weight-bearing status.

Data was analyzed from 1018 cases. Most studies were clinical evidence level 3 (n=4), followed by level 2 (n=3), and our lowest being level 4 (n=2). 741 osteotomies were included with predominantly female (88%) participants and an average age of 58.8 years. Floating toe incidence post-osteotomy was 20%.

Floating toe incidence post-MWO showed a 16% reduction since 2011. This decline warrants further exploration of underlying factors and targeted interventions. A significant decrease in floating toe incidence post-MWO was observed compared to 2011.

Format
Systematic Review

Case Rpt Followup
12

Student Club
Iowa

Classification
Forefoot Reconstruction

Level of Evidence
Level IV

Authors/Financial Disclosures

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Purpose
The Peroneus Brevis (PB) muscle flap is described in the literature as a reliable and versatile soft tissue coverage option utilized in limb salvage procedures by foot and ankle surgeons. However, the success of this procedure remains unclear.

Methodology
A systematic review of studies published in PubMed databases through August 2023 was conducted to identify articles that evaluated the success rates of PB flaps in limb salvage operations. We followed standard methodology for performing a systematic review using PRISMA guidelines. Studies using cadaver or animal models, focusing on non-PB muscle flaps, follow-ups of less than 3 months, and case studies (n<3) were excluded. Summary estimates for mean success of PB procedures were generated from the included studies.

Results
The mean success rate between 14 of the studies analyzed was 89%. The follow-ups ranged from 3 to 85 months. Success was defined as a viable PB flap with adequate defect coverage and return to ambulation post-op. Of the 292 patients undergoing a PB muscle flap, 10 patients had complete flap loss and one required a below-the-knee amputation due to non-compliant post-op behavior.

Discussions
PB flaps are an in-valuable option in limb salvage when prior treatments have failed due to low risk.

Format
Systematic Review
Title
Comparing MIS bunion surgery techniques of first, second & third generation, and overall outcomes.

Submit Date
11/16/2023

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Purpose
The purpose of this study is to better understand the success rates and challenges of minimal invasive bunion surgery and if this surgical technique will become more common in future practice.

Methodology
17 articles were selected, with the general design of this study as a qualitative research.

Procedures
The articles did show statistical evidence of improvement pre-op to post-op with the IMA decreasing on an average of 4-6 degrees and the HAV angle decreasing on an average of 10-20 degrees. However, overall the complication rate was an average of 10% throughout the articles, with majority being a shortened first metatarsal and either non-union or delayed union.

Results
Overall, 3rd generation MIS bunion surgery is an effective surgery technique that holds very few complications when performed correctly. It is a safe surgery that can correct a moderate symptomatic hallux valgus, but is a technique that takes time to learn and if not performed correctly, due to improper minimal incision technique, can lead to majority of the complications faced with this type of technique.

Discussions

Format
Systematic Review

Case Rpt Followup
0

Student Club
Arizona

Classification
Arthroscopy

Level of Evidence
Level II

Authors/Financial Disclosures

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A case report on an additional 4th fail safe beam during Charcot Reconstruction utilizing the truss and tie-rod complex principle

Purpose
Concept of beaming the medial column using large-diameter cannulated screws was introduced in 1997. This approach, along with beaming the lateral column and STJ, has been identified as a crucial factor in enhancing the durability of hindfoot and Lisfranc Charcot foot repairs. This report theorizes, in conjunction with previously described triple arthrodesis, that by adding an additional 4th beam from 2nd metatarsal base to the calcaneus head, the truss complex may be more rigid and further prevent the collapse of the medial arch, if the medial beam fixation begins to fail.

Methodology
Once all 3 triple beams were inserted, a guidewire was inserted from the dorsal second metatarsal into the calcaneus, followed by under drill and 5.0x110 mm screw insertion to serve as an additional support.

Results
1 year follow up showed no significant complaints, no new ulcer formation. As a progressive disease, pt’s Charcot foot did further collapse slightly. However, there was no significant breakdown of the medial column that resulted in bony prominences and ulcer formation. It can be noted that the talar head now rests on the 5.0 screw from 2nd metatarsal to the calcaneus which acts as a fail-safe screw as we theorized.

Discussions
There are no long-term studies available on an additional 4th beam. By adding a 4th screw/beam, we hope to achieve a stronger construct and further minimize possible future complications including recurrence of midfoot collapse. In this single case study, at 1 year follow up, it is apparent that the 4th fail safe beam was advantageous.
Atypical Presentation of Soft Tissue Sarcoma in foot and ankle: A Case Series

08/31/2023

Kasra Karamlou, DPM
Nicole Nicolosi, DPM
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The incidence of pedal soft tissue sarcomas is very rare. Soft tissue sarcomas can present with atypical symptoms and mimic more common benign conditions, leading to diagnostic challenges. The purpose of this case series is to illustrate the importance of having soft tissue Sarcomas on your differential diagnosis, even when symptoms appear to indicate other conditions.

The first case involves a 39-year-old male presenting with symptoms resembling tarsal tunnel syndrome. His MRI showed heterogeneous mass and an open incisional biopsy was performed which resulted as synovial sarcoma. Patient underwent a below the knee amputation due to the extent of the sarcoma. Within one year he was diagnosed with metastasis to his lungs and his sacrum. The second case features a 25-year-old female with signs and symptoms consistent with a ganglion cyst. MRI was ordered which showed concerns for neoplastic involvement. Core Biopsy resulted with myxoinflammatory fibroblastic sarcoma. The patient underwent successful radical resection of the soft tissue tumor in her foot by an orthopedic oncology specialist.

Case 1: Biopsy resulted as Synovial Sarcoma
Case 2: Biopsy resulted as Myxoinflammatory fibroblastic sarcoma

These two cases underscore the challenge of diagnosing soft tissue sarcoma when the presentation mimics more common benign conditions. Clinicians must maintain a high index of suspicion and consider soft tissue sarcoma in patients with atypical symptoms or when routine diagnostic interventions yield unexpected results. Early recognition, timely biopsy, and multidisciplinary management are vital for optimizing patient outcomes.