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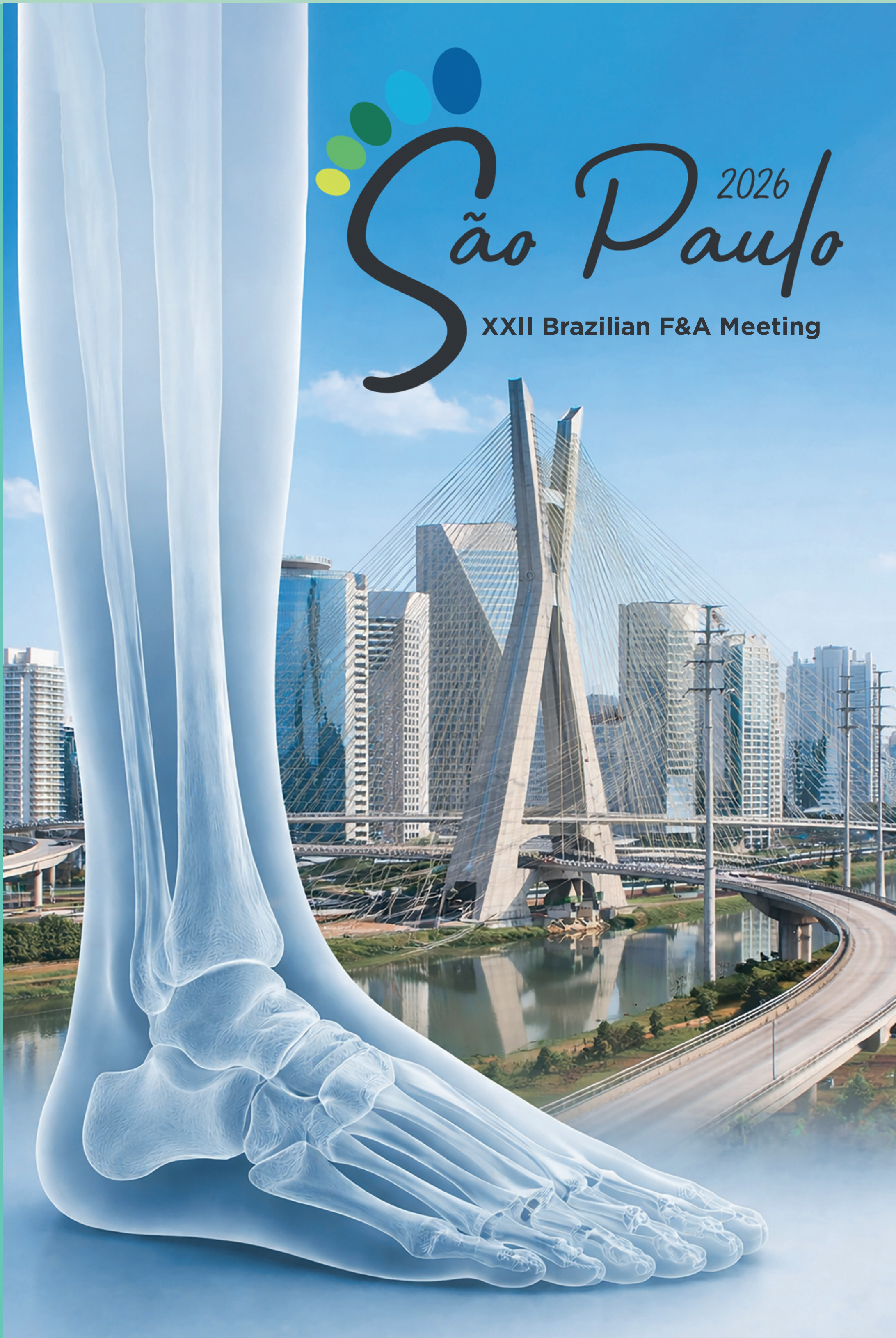

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São Paulo 2026
XXII Brazilian F&A Meeting

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Volume 20, Supplement 1, January-April

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Message from the President

JOURNAL OF THE Foot & Ankle JFA

ANTONIO ALICIO OLIVEIRA JUNIOR

President of ABTPé

Dear Colleagues,

Our society follows a solid path of planned and sustainable growth, based on the history we have built over the years. The Brazilian Congress of Ankle and Foot Surgery is undoubtedly one of the greatest expressions of ABTPé's strength and maturity and, above all, a unique opportunity for each member to awaken to new knowledge, refine their practice, and incorporate the most current in the specialty.

At the end of this journey, our patients benefit most, assisted by an increasingly qualified specialist prepared to offer the best solutions for foot and ankle pathologies.

In this same sense, it is a reason for great satisfaction to follow the consistent evolution of the ***Journal of the Foot and Ankle***, which at this moment presents a special supplement dedicated to the papers approved for the congress. This initiative values our colleagues' scientific output, further enhances the event, and strengthens the relevance of our society's publications.

We live in a moment of true scientific celebration. I would like to take this opportunity to thank everyone who contributed to the planning and execution of this congress, especially its president, Dr. Marco Túlio Costa, and Prof. Dr. Caio Nery, editor-in-chief and creator of this important supplement, whose tireless dedication to the scientific growth of our society is a reason for recognition and inspiration for all of us.

May this be a moment of gathering, updating, and inspiration — a unique opportunity to renew our knowledge and improve our practice, enhancing ABTPé's specialty and specialists together.

Sincerely,

Dr. Antonio Alicio Oliveira Junior is Head of the Orthopedics Department at Santa Casa de Maceió, Clinical Instructor at the State University of Health Sciences and CESMAC University Center, and President of ABTPé.

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JOURNAL OF THE Foot & Ankle IFA

Advancing Scientific Excellence: Highlights from the 22nd Brazilian Congress of Ankle and Foot Medicine and Surgery

MARCO TÚLIO COSTA

President of the 22nd Brazilian Congress of Ankle and Foot Medicine and Surgery.

Dear colleagues,

It is with great satisfaction that we present this special supplement of our scientific journal, dedicated to the annals of the papers submitted as free topics and posters of the 22nd Brazilian Congress of Ankle and Foot Medicine and Surgery, held in São Paulo. As Congress President, I have the privilege of witnessing the growth in the number and quality of scientific papers submitted to our event.

In this supplement, we publish a diverse selection of abstracts of original papers, ranging from anatomical research to arthroscopy studies, diabetic foot, and ligament injuries, among others. The selected free topics and posters reflect the methodological rigor and clinical relevance of the contributions, which underwent peer review to ensure academic excellence.

We thank the authors for sharing their innovative findings, the reviewers for their indispensable expertise, and the organizing committee for their tireless commitment. May this supplement inspire collaborations, stimulate new research, and strengthen our scientific community. I invite everyone to explore these pages and actively participate in the next editions of the Congress.

Together, we advance excellence in foot and ankle care in Brazil.

Abstract Number: 10888

JOURNAL OF THE Foot & Ankle

Deltoid all-inside repair in SER IV bimalleolar-equivalent ankle fractures

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Introduction: Ankle fractures are the second most common fractures of the lower limb. In supination-external rotation (SER) stage 4 injuries, the medial malleolus or the deltoid ligament is disrupted. The stability of the deltoid ligament is essential for functionality; however, the need for surgical repair remains debated. The aim of this study is to assess deltoid stability in 12 ankle fractures treated with an all-inside repair technique.

Methods: A prospective case series of 12 patients (8 male, 4 female aged between 25 and 53 years who had a stage 4 Lauge-Hansen SER ankle fracture with unstable deltoid ligament injury between September 2023 and February 2024. No patients in this study had an associated posterior malleolus fracture. All patients underwent deltoid all-inside repair at the time of fracture fixation. Outcomes were measured using the VAS scale, radiographic and magnetic resonance imaging (MRI), and AOFAS scores, which are reported exclusively in the Supplementary Material for historical comparability. Stability was assessed using stress and weight-bearing radiographs to measure talar tilt (TT) and medial clear space (MCS).

Results: Clinically, the patients had good results, with a mean VAS of 1.5 and an AOFAS score of 87 at 6-month follow-up. There were no complications observed during the study period. MCS remained stable ($p = 0.125$), with means of 3.03 mm (postoperative), 2.87 mm (weight-bearing), and 3.38 mm (stress). Similarly, TT remained consistent ($p = 0.597$), with means of 1.17º (postoperative), 0.87º (weight-bearing), and 1.14º (stress). These findings confirm the preservation of joint alignment and ligament integrity post-repair.

Conclusion: To the best of our knowledge, all-inside deltoid repair has been described; however, reports specifically within SER IV bimalleolar-equivalent fractures and short-term radiographic stability remain limited. The technique demonstrated favorable short-term functional outcomes and radiographic stability.

Keywords: Ankle fractures; Arthroscopic surgical procedures; Ligaments, articular.

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This abstract was presented at the XXII Brazilian F&A Meeting 2026, held in São Paulo, Brazil, from April 18 to 21, 2026.

Abstract Number: 10889

JOURNAL OF THE JFA Foot & Ankle

Association of medial talar chondral lesions with deltoid ligament ruptures in ankle fractures: a multicenter study of 100 cases

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Introduction: Deltoid ligament ruptures are common in the context of ankle fractures and may be managed either conservatively or surgically, there is currently no clear consensus regarding the optimal treatment approach. This study aimed to determine the incidence of medial talar chondral lesions (MTCL) in ankle fractures with deltoid ligament (DL) rupture and to evaluate their relationship with fracture characteristics. The authors hypothesized that a high incidence of MTCL would support the indication for open DL repair.

Methods: This was a retrospective, multicenter, cross-sectional study that included 100 consecutive adult patients with ankle fractures and DL rupture who underwent surgical treatment between 2020 and 2022. All patients underwent a standardized anteromedial ankle arthrotomy with open DL repair. MTCL were identified intraoperatively, measured, classified according to Hintermann et al., and treated when necessary. Fractures were classified using the AO system, and associated injuries (posterior malleolar fracture, syndesmotic injury, tibiotalar dislocation) were recorded. Statistical analysis was performed using chi-square tests, with $p < 0.05$ considered significant.

Results: MTCL were identified in 43% of patients. Lesions ranged from superficial cartilage damage to full-thickness defects, with 30% of MTCL involving subchondral bone exposure. Intra-articular loose bodies were found in 13% of the total cohort and in 30% of patients with MTCL. A significant association was observed between MTCL and posterior malleolar fractures ($p = 0.04$). No significant correlations were found between MTCL and AO fracture classification, syndesmotic injury, or tibiotalar dislocation. Severe MTCL (Hintermann type 4) showed no significant association with fracture characteristics.

Conclusion: There is a high incidence of MTCL in ankle fractures associated with DL rupture. Posterior malleolar involvement appears to increase the risk of MTCL. Open DL repair via anteromedial arthrotomy allows identification and treatment of relevant intra-articular pathology and may provide additional justification for DL repair during ankle fracture fixation, particularly when posterior malleolar fractures are present.

Keywords: Incidence; Ligaments; Rupture; Ankle fractures.

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Abstract Number: 10903

JOURNAL OF THE JFA Foot & Ankle

Results of Lisfranc lesions treated with TightRope® fixation – interosseous suture button – minimum follow-up of 5 years

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Introduction: Open reduction with internal fixation or primary arthrodesis are considered gold standards for the treatment of Lisfranc lesions. However, several disadvantages are associated with these procedures, including loss of joint mobility and potential cartilage damage. More recently, TightRope® has emerged as an alternative treatment for Lisfranc lesions, which can be used alone or in combination with traditional techniques, with the potential to mitigate some of these disadvantages. The primary outcome of the study was to evaluate the functional outcomes of 20 patients treated with the TightRope® technique for Lisfranc lesions. The secondary outcome was to evaluate and describe the complications associated with the procedure.

Methods: Retrospective review conducted in 20 patients undergoing surgery for acute Lisfranc lesions using the TightRope® technique. Mean follow-up was 83 months. Clinical evaluation involved assessment of complications, reoperations, midfoot AOFAS scores, VAS scores, patient satisfaction, and ability to return to previous activities. Radiographic analysis was performed to evaluate the maintenance of reduction and the development of osteoarthritis.

Results: Patients demonstrated excellent results with a mean AOFAS midfoot score of 95.5 and a mean VAS of 0.50. Incomplete reduction was the only factor that significantly influenced lower AOFAS and VAS scores. Most complications were minimal.

Conclusion: The TightRope® technique has been shown to be a reliable alternative for the treatment of acute Lisfranc lesions, providing satisfactory clinical and functional results.

Keywords: Forefoot, human; Suture techniques; Orthopedic fixation devices.

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This abstract was presented at the XXII Brazilian F&A Meeting 2026, held in São Paulo, Brazil, from April 18 to 21, 2026.

Abstract Number: 10930

JOURNAL OF THE JFA Foot & Ankle

Radiographic parameters of normality and their application in compression-type fractures ("nutcracker") of the cuboid bone

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Introduction: Cuboid fracture is associated with Lisfranc lesions, which may present with a lateral crushing pattern ("nutcracker") and lead to complications such as arthrosis and abduction deformity. The study ought to establish normal radiographic parameters of the cuboid, with assistance in therapeutic decision-making for fractures and deformities.

Methods: Selected 516 adult patients (516 feet) between 18 and 70 years (258 of each gender), without a cuboid lesion. Internal oblique radiographs were taken, and two parameters were evaluated: the measurement of the alpha angle formed between the distal and proximal articular surfaces of the cuboid and the ratio between the length of the lateral and medial walls. Fifteen patients with cuboid fracture-compression were evaluated, and their results were compared with those of the control group.

Results: Radiographic parameters were evaluated, and the results by gender and age group were divided into groups (18 to 50 and 50 to 70 years). The angle of the control group ranged from 21.6 to 49.2 degrees, with a mean of 35.62 degrees. The cortical ratio of the cuboid ranged between 0.37 and 0.69, with a mean of 0.52, and there was no difference between genders. There was a difference between the findings, with an increase in the alpha angle in males (35.11 degrees to 36.13 degrees). Patients with fracture-compression presented changes in the angle, with values between 38 and 48.5 degrees, a mean of 42.27 ($p = 0.000$), and in the relationship between the cortical, with values between 0.37 and 0.48, a mean of 0.43 ($p = 0.000$).

Conclusion: The radiographic parameters studied may be useful for the anatomical definition of the cuboid and in the treatment of several diseases.

Keywords: Bone, cuboid; Fractures, bone; Radiography.

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Abstract Number: 10956

JOURNAL OF THE Foot & Ankle

Weight-bearing computed tomography in the identification of intercuneiform instability in Lisfranc lesion: a case report

Rodrigo Sousa Macedo[1], Fabio Correa Paiva Fonseca[1], Vinicius Thiago Conde Bertelli[1], Rafael Barban Sposeto[1], Túlio Diniz Fernandes[1], Alexandre Leme Godoy-Santos[1]

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Lisfranc lesions have a high rate of diagnostic failure (> 30%), especially in isolated ligament injuries. Diagnostic delay is associated with chronic pain and instability of the middle foot. Weight-bearing computed tomography (WBCT) emerges as a promising tool. The objective of this report is to present a case in which this modality of examination identified intercuneiform instability not detected by conventional methods. Evaluation of a female patient, a marathon runner, with a Lisfranc injury after falling down stairs. Performed: weight-bearing radiography, comparative bilateral conventional tomography and weight-bearing computed tomography. Surgical exploration with evaluation under intraoperative radioscopy. Conventional examinations identified C1-M1, C1-M2, C2-M2 instability and plantar avulsion at the base of the second metatarsal. Weight-bearing computed tomography additionally showed intercuneiform asymmetry (C1-C2, which was not detected in the stress test under intraoperative radioscopy. Surgical exploration confirmed this instability, modifying the planning. Fixation performed with cannulated screws 3.5 mm and a dorsal plate. Weight-bearing tomography represents an advance in the diagnosis of Lisfranc lesions, especially hidden instabilities. When unavailable, systematic intraoperative exploration is indispensable for complete diagnosis and appropriate treatment.

Keywords: Foot injuries; Metatarsal bones; Tomography, X-Ray Computed; Weight-bearing.

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Abstract Number: 10964

JOURNAL OF THE JFA Foot & Ankle

Syndesmosis Fixation with Rigid Synthesis in Weber B and C Ankle Fractures: A Retrospective Analysis of 100 Consecutive Cases Evaluating Screw Position and Reduction Outcomes

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Introduction: Ankle fractures involving syndesmotic disruption represent a significant challenge in orthopedic surgery. Weber B and C fractures frequently involve the tibiofibular syndesmosis, and inadequate treatment can lead to chronic instability and post-traumatic osteoarthritis. The objective of this study is to evaluate the outcomes of rigid syndesmotic fixation in Weber B and C ankle fractures, analyze screw-related complications, and assess maintenance of syndesmotic reduction.

Methods: Retrospective case series of 100 consecutive patients who underwent screw fixation for Weber B or C ankle fractures with syndesmotic instability. Parameters evaluated included screw position (suprasyndesmotic vs. transsyndesmotic), implant-related complications, hardware removal rates, and maintenance of reduction.

Results: The cohort comprised 43 Weber B (43%) and 57 Weber C (57%) fractures. Suprasyndesmotic placement was used in 39 patients (39%), transsyndesmotic in 61 patients (61%). Suprasyndesmotic screws had a 30.8% breakage rate compared with 3.3% for transsyndesmotic screws (p = 0.0006). Syndesmotic reduction was maintained in 98% of cases. Both cases of lost reduction occurred after screw removal.

Conclusion: Rigid screw fixation demonstrates excellent reliability for maintaining syndesmotic reduction. Transsyndesmotic placement significantly reduces implant failure rates. Hardware removal may compromise ankle stability.

Keywords: Ankle joint; Ankle fractures; Bone screw; Fracture fixation, internal.

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Abstract Number: 10973

JOURNAL OF THE JFA Foot & Ankle

Can posterior malleolus fracture classification influence treatment choice?

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Introduction: To evaluate the intra- and interobserver reproducibility of three classifications of posterior malleolus fractures (PMF) and to analyze the relationship of treatment choice and surgical approach with the classifications.

Methods: Computed tomography of the ankle of 50 patients was evaluated by ten observers, four orthopedists specialized in foot and ankle surgery, and six non-specialist orthopedists, with an interval of two weeks between evaluations. The evaluators classified PMF according to the Mason, Haraguchi, and Bartoníček/Rammelt classifications and assessed how they would treat PMF—conservatively or surgically (in this case, by which access route they would use). Cronbach's alpha was used to assess intraobserver agreement, and the Kappa test was used to assess interobserver agreement. The correlation of decision-making and access route was analyzed using the Chi-Square Test (Q^2).

Results: Intraobserver reproducibility ranged from 0.53 to 0.95 (0.78 ± 0.12) for the Haraguchi classification, from 0.47 to 0.95 (0.74 ± 0.17) for Mason, and from 0.53 to 0.94 (0.72 ± 0.12) for Bartoníček/Rammelt, representing an adequate agreement for all. For the experts, the mean ratings for Haraguchi, Mason, and Bartoníček/Rammelt classifications were 0.86, 0.84, and 0.75, representing good, good, and adequate, respectively. For the group of non-specialists, the means were 0.72, 0.68, and 0.70, representing an adequate, average, and adequate classification, respectively. Interobserver reproducibility was considered reasonable for Haraguchi (0.38) and moderate for Mason (0.42) and Bartoníček/Rammelt (0.43). When analyzing decision-making and the access route, all classifications showed a large effect size (V > 0.50).

Conclusion: The three classifications were adequate for intraobserver and reasonable or moderate for interobserver. All showed a great effect on the therapeutic decision, with Bartoníček/Rammelt being the highest values.

Keywords: Classification; Ankle fractures; Reproducibility of results.

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Abstract Number: 11004

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Risk factors for infection associated with calcaneal fracture in open reductions and internal fixations: A retrospective cohort

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Introduction: The high rates of infections associated with open reduction and internal fixation (ORIF) of calcaneal fractures make it necessary to mitigate the risk factors for infection in this type of osteosynthesis. The objective of this study is to identify independent risk factors for fracture-associated infection (FAI) in ORIF of calcaneal fractures.

Methods: Retrospective and observational study using data extracted from the TriNetX global platform, including patients of both sexes with a confirmed diagnosis of calcaneal fracture and who underwent surgical treatment with ORIF. The International Classification of Diseases (ICD), version 11, code S92.0 was used. The level of statistical significance adopted in the analysis was 5% (0.05). The primary outcome assessed was infection associated with the fracture within one year after surgical treatment of the fracture.

Results: A total of 2,830 patients were selected for the study, with a mean general age of 50 years (SD ± 15), mostly men, 1,788 (63.8%). During the evaluation period, 181 patients had FAI within 1 year of surgical treatment. In the analysis of the risks of independent factors for FAI, the variables smoking [OR 1.8 (CI 0.02;0.06)], alcohol abuse [OR 1.6 (CI 1.0;2.6)], chronic kidney disease [OR 2.23 (CI 1.13;4.39)], overweight [OR 2.8 (CI 1.34;5.89)], fall from height [OR 2.18 (CI 1.47;3.25)] and open fracture [OR 2.13 (CI 1.07;4.23)] were statistically significant for the infection outcome.

Conclusion: The identification of risk factors is essential to avoid unfavorable outcomes in ORIF's of calcaneal fractures. Smoking, alcohol abuse, chronic kidney disease, being overweight, falls from height, and open fractures were independent risk factors for infection.

Keywords: Infections; Fractures, bone; Calcaneus; Surgical wound infection.

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Abstract Number: 11009

JOURNAL OF THE JFA Foot & Ankle

Epidemiological and secondary ankle stabilizer analysis of professional and amateur field soccer players

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Introduction: Football has a high incidence of injuries. The most common injuries are bruises, sprains, and strains, especially to the ankles. Imbalances in muscle strength, motor control, and proprioception, along with prior injuries, increase the risk of new injuries and sprains. The objective of this study is to evaluate and compare epidemiological and performance data from functional tests of professional and amateur soccer athletes at different levels of practice, to identify possible risk and prevention factors for ankle injuries.

Methods: Twenty-nine athletes aged 18 to 26 years were divided into two groups (professional and amateur). An epidemiological questionnaire was administered, collecting data on injury history, duration of modality practice, and frequency of physical and technical training in the field, followed by functional tests of single-leg long jump, Side Hop Test, Y Balance test, and objective evaluation of ankle strength using a manual dynamometer. Data were analyzed with descriptive and inferential statistics.

Results: A total of 53.3% of amateurs reported previous ankle injury, against only 14.3% of professionals. The professionals, with longer practice time and greater training frequency, also achieved better performance on the unipodal jump, lateral jump, and Y Balance test, especially in the diagonal planes. The strength studied showed a significantly smaller difference in eversion among amateurs.

Conclusion: Amateur athletes had a higher history of injuries and muscle imbalances, and lower functional performance, indicating a higher risk of ankle sprain.

Keywords: Soccer; Ankle injuries; Athletic performance.

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JOURNAL OF THE JFA Foot & Ankle

Treatment of type Weber B lateral malleolus fractures: Comparison between MIPO technique and conventional approach

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Introduction: Displaced fractures (>2 mm) of the lateral malleolus, without associated lesions, still generate debate as to the ideal management. Historically treated with cast immobilization, they began to have an expanded surgical indication, searching for faster functional recovery and reduction of the risk of secondary osteoarthritis. The minimally invasive technique (MIPO) appears as an alternative to the traditional open approach, with potential reduction of tissue aggression. This study aims to evaluate the MIPO technique for the treatment of type Weber B lateral malleolus fractures, comparing it with the conventional open approach in terms of functional recovery, operative time, and complications.

Methods: Prospective, randomized study involving 40 patients undergoing osteosynthesis with a 1/3 tubular plate. Participants were divided into two groups: open lateral access (n = 19) and MIPO technique (n = 21). Surgical time, complications, and function were assessed using the AOFAS score at weeks 2, 6, and 12 postoperatively.

Results: Surgical time was significantly shorter in the MIPO group (median 22 minutes) compared to the conventional group (46 minutes; $p < 0.001$). At the 2-week evaluation, the AOFAS score was higher in the MIPO group (median 76 vs. 65; $p = 0.046$), with better gait performance, range of motion, and distance traveled. At weeks 6 and 12, both groups showed satisfactory functional recovery, with no statistically significant difference in final scores (98.56 vs. 95.25; $p = 0.136$) or in the postoperative complication rates.

Conclusion: The MIPO technique proved safe and effective for treating Weber B lateral malleolus fractures, with shorter surgical time and earlier functional recovery compared with the open approach, without increasing complications or impairing final results.

Keywords: Ankle fractures; Gait; Fracture fixation, internal.

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Clinical results of proximal release of the medial gastrocnemius in the treatment of non-insertional Achilles tendon tendinopathy

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Introduction: Noninsertional tendinopathy of the Achilles tendon is a common and disabling condition, particularly in athletes. Current interventional treatments include medications, infiltrations, and surgical procedures such as tendon transfers. This study aimed to evaluate the results of proximal release of the medial gastrocnemius (PMGR), a relatively low-morbidity procedure, in the treatment of noninsertional Achilles tendon tendinopathy.

Methods: Twelve patients diagnosed with non-insertional Achilles tendon tendinopathy, as determined by clinical examination and confirmed by nuclear magnetic resonance, who were refractory to conservative treatment underwent PMGR. Five patients had bilateral involvement, resulting in 17 treated tendons.

Results: After a mean follow-up of 32 months, the mean AOFAS score increased from 62.0 preoperatively to 90.2 at the last follow-up. The mean pain score on an analog scale decreased from 6.7 preoperatively to 1.9 at the last follow-up. Although some patients had residual pain, in all cases it was milder than preoperative pain, and all participants reported satisfaction with the treatment performed.

Conclusion: Despite the small sample size and short follow-up period, the results indicate that PMGR is a less invasive alternative for treating noninsertional Achilles tendinopathy.

Keywords: Tendinopathy; Achilles Tendon; Muscle, Skeletal.

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Endoscopic flexor hallucis longus transfer for acute Achilles tendon ruptures is associated with a high re-rupture rate: A prospective case series

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Introduction: Achilles tendon rupture (ATR) is a frequent injury with significant functional impact. Endoscopic transfer of the flexor hallucis longus (FHL) has been proposed as a minimally invasive alternative, but its role in acute cases remains controversial. This study aimed to evaluate patient-reported outcomes, functional capacity, and re-rupture rates after endoscopic FHL transfer for acute ATR. **Methods:** Prospective case series including 26 patients (15 men, 11 women; mean age 47.7 years) with acute ATR treated with isolated endoscopic FHL transfer between March 2022 and December 2023. Minimum follow-up was 12 months. Assessments included pain (VAS), VISA-A, ATRS, AOFAS, plantar and hallux flexion strength, ankle mobility, heel rise, lunge test, and Achilles tendon resting angle. **Results:** Five patients (19.2%) sustained re-rupture between the second and fourth postoperative week. At 12 months, mean VAS was 0.5, VISA-A 94.4 (95% CI: 90.8–100), and ATRS 5.1. Plantar flexion strength and ankle mobility were significantly lower on the operated side versus contralateral ($p = 0.015$ and $p < 0.001$). No wound healing or neurovascular complications were observed.

Conclusion: Despite satisfactory functional scores, the isolated endoscopic FHL transfer showed an unacceptably high re-rupture rate in acute ATR. This technique should not be routinely indicated for very active patients seeking a rapid return to activity

Keywords: Achilles tendon rupture; Flexor hallucis longus; Endoscopy.

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Postoperative evaluation of patients undergoing minimally invasive treatment for acute calcaneal tendon rupture

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Introduction: Achilles tendon rupture (ATR) is a frequent musculoskeletal injury, representing the most affected tendon of the lower limb, with an incidence of approximately 40 cases per 100,000 inhabitants. With the advancement of surgical techniques, minimally invasive procedures have gained prominence for promoting less tissue aggression, reduced complications, and potentially faster rehabilitation. Among these techniques, the use of the Tenolig® device stands out, which is designed to promote adequate approximation of the tendon stumps during the healing process. Thus, the present study aims to evaluate the degree of patient satisfaction and clinical-functional results, such as pain, range of motion, muscle strength, time to return to activities, and occurrence of complications, undergoing the minimally invasive technique in the treatment of Achilles tendon rupture, using a percutaneous repairer (Tenolig®) followed by Alfredson eccentric protocol.

Methods: Retrospective and descriptive observational study, including 20 patients with acute Achilles tendon rupture (<5 days), treated by percutaneous technique with Tenolig®

Results: The sample consisted predominantly of men (75%), with a mean age of 39.7 years. The ATRs score showed that 75% of patients had a score of 0, indicating no functional limitation. The mean Alfredson test execution time was 31.8 seconds, with no significant pain. There was one case of re-rupture (5%). Lower adherence to the rehabilitation protocol was observed among patients with lower education and social support.

Conclusion: Minimally invasive treatment with Tenolig® proved effective and safe in the management of acute Achilles tendon rupture, with low complication rates and excellent functional results.

Keywords: Minimally invasive surgical procedures; Achilles tendon; Rehabilitation.

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Neglected Achilles tendon ruptures: literature review

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Introduction: Achilles tendon rupture is the most common lower limb tendon injury, with rising incidence in active adults. Up to 25% are initially neglected, becoming chronic after four weeks and leading to functional impairment. This study reviews current treatments, outcomes, and complications of neglected Achilles tendon ruptures. The objective is to review the literature on current treatments for neglected Achilles tendon ruptures, their outcomes, and potential complications.

Methods: A bibliographic review of the state of the art was conducted in national and international databases. Articles published in indexed journals between 1991 and 2022 that addressed the treatment of Achilles tendon ruptures with more than four weeks of evolution were selected; however, only articles with less than 22 years of publication (2000-2022) were analyzed.

Results: Surgical treatment is well established for patients with significant functional demands. The various surgical techniques described in the literature and currently used have similar success rates and complication profiles, particularly regarding patient satisfaction, functional outcomes, anthropometric measurements, and return to work and sports activities.

Conclusion: Several techniques can be used to treat neglected Achilles tendon ruptures. When choosing the most appropriate technique, gap size, patient characteristics, and surgeon experience should be considered.

Keywords: Achilles tendon; Rupture; Surgical procedures.

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Posterior Tibial Tendon Dislocation Associated with Achilles Tendon Rupture: A Case Report

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Introduction: Posterior tibial tendon dislocation is an uncommon injury. This pathology is believed to develop from an involuntary, forceful contraction of the posterior tibial muscle triggered by forced ankle inversion combined with sudden dorsiflexion. It is often accompanied by other ankle traumas that obscure its diagnosis. This report describes a rare case of concurrent posterior tibial tendon dislocation and Achilles tendon rupture in a 37-year-old male, injured during a soccer match.

Methods: Initial examination confirmed a complete Achilles tendon rupture but overlooked medial ankle pain and edema. Magnetic resonance imaging revealed posterior tibial tendon dislocation with flexor retinaculum detachment and an Achilles tendon rupture located 5.5 cm proximal to its calcaneal insertion. Surgical intervention was performed in a single session, addressing both injuries. The posterior tibial tendon dislocation was corrected through a medial approach, with tendon reduction into its retromalleolar groove and flexor retinaculum reattachment to the medial tibia using transosseous sutures.

Results: Achilles tendon repair was achieved using a minimally invasive Dresden technique. Postoperative rehabilitation included progressive weight-bearing, mobility exercises, and strengthening protocols, tailored to manage both injuries concurrently. By the seventh postoperative month, the patient demonstrated full recovery, with restored tendon stability, no pain or edema, and a return to pre-injury sports activities.

Conclusion: This is the second reported case of concurrent Achilles tendon rupture and posterior tibial tendon dislocation and the first to propose a comprehensive surgical strategy addressing both conditions simultaneously. Early recognition and tailored surgical planning are critical to prevent chronic complications and restore functional outcomes in these rare cases.

Keywords: Posterior tibial tendon dysfunction; Achilles tendon; Rupture.

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Functional Evaluation of Acute Achilles Tendon Rupture Treatment Using the Dresden Technique: A Case Series

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To evaluate functional outcomes, quality of life, and complications after repair of acute Achilles tendon rupture using a minimally invasive Dresden technique. Achilles rupture is common, and management remains debated; minimally invasive approaches aim to preserve functional outcomes while reducing soft-tissue complications and sural nerve injury risk. Single-center case series (2015–2024) at a tertiary orthopedic institute. Adults with noninsertional acute ruptures (≤2 weeks) underwent repair with the Dresden technique, using minor instrument modifications and a standardized rehabilitation protocol. Outcomes included Foot and Ankle Outcome Score (FAOS), Achilles Tendon Total Rupture Score (ATRS), EuroQol 5-Dimension 5-Level questionnaire (EQ-5D-5L), Patient Reported Outcomes Measurement Information System (PROMIS), heel-rise test, calf circumference, maximum plantarflexion/dorsiflexion, and gravitational equinus angle. Thirty-one patients (mean age 37.0 ± 10.55 years; 64.5% male) completed follow-up. Mean scores: FAOS 99.03 ± 1.73, ATRS 98.29 ± 2.64, EQ-5D-5L 0.98 ± 0.03, PROMIS 61.0 ± 0.51 (range 60.3–61.5). Heel-rise: 24/31 (77.4%) maintained single-leg support. Complications: none for infection, wound dehiscence, rerupture, or deep vein thrombosis; two transient sural nerve-related symptoms resolved by 2 months. Plantarflexion: 25.42° (operated) vs 25.45° (nonoperated), mean difference 0.03° (SD 0.18), $p > 0.05$. Dorsiflexion and gravitational equinus: no significant side-to-side differences. Calf circumference difference 1.08 cm ($p < 0.05$), not correlated with functional scores ($p > 0.05$). Very strong, statistically significant intercorrelations were observed among FAOS, ATRS, EQ-5D-5L, and PROMIS. The modified minimally invasive Dresden repair yielded excellent functional outcomes, high quality-of-life scores, and very low complication rates, with no meaningful deficits in ankle range of motion. Calf atrophy was small and not functionally relevant.

Keywords: Achilles tendon rupture; Complications; dresden.

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Long-Term Follow-Up After Calcaneoplasty: Does It Really Work?

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Introduction: Posterior heel pain due to Haglund deformity is a common cause of functional limitation in active patients. While most cases respond to conservative treatment, some require surgery. Evidence on long-term outcomes after endoscopic calcaneoplasty remains limited. The objective os this study is to evaluate long-term clinical outcomes, complications, and return to activity after endoscopic calcaneoplasty, with a minimum five-year follow-up.

Methods: A retrospective analysis of consecutive patients undergoing endoscopic calcaneoplasty between 2016 and 2020 after failure of ≥ 6 months of nonoperative treatment was performed. VAS, AOFAS, and VISA-A scores were collected preoperatively, at one year, and at five years. Return to activity and complications were recorded.

Results: Twelve patients (14 feet) were included, with a mean follow-up of 60 months. Significant improvement was observed in all scores ($p < 0.001$). Mean VAS improved from 9.07 to 1.8; AOFAS from 38.7 to 94.6; and VISA-A from 37 to 85. Satisfaction rate was 91%. Most patients returned to their previous activity level. Complications were infrequent and mainly minor, with one reoperation.

Conclusion: Endoscopic calcaneoplasty provided significant and sustained pain relief and functional improvement at five years, with high satisfaction and low complication rate. Outcomes continued to improve beyond the first postoperative year, supporting the procedure as a reliable option for refractory Haglund deformity.

Keywords: Achilles Tendon; Surgical procedures; Calcaneus.

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Excellent Functional Outcomes and Low Complication Rates After Arthroscopic Broström Repair With Internal Brace Augmentation for Chronic Lateral Ankle Instability

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Introduction: Chronic lateral ankle instability (CLAI) may persist after recurrent sprains, causing pain, giving-way, and functional limitation. Arthroscopic Broström repair with minimally invasive internal brace augmentation (IBA) may improve stability and support earlier rehabilitation. This study evaluated functional outcomes, complications, and recovery after minimally invasive IBA for CLAI.

Methods: Retrospective multicenter cohort of consecutive adults (> = 18 years) with CLAI treated with minimally invasive Arthroscopic Broström plus IBA (2018-2022) at three tertiary centers in Brazil. Primary outcome: change in AOFAS Hindfoot score. Secondary outcomes: pain, complications, residual stiffness/range of motion loss, and return to activity/sport. Mean follow-up: 2.4 ± 1.3 years.

Results: Seventy-six patients were included (35.1 ± 10.2 years; 51.3% male). Mean AOFAS improved from 54.6 ± 15.9 to 95.9 ± 5.5 ($p < 0.001$), with a median gain of 41 points (95% CI 37.0-44.5; Cohen d = 3.18). Return to preinjury activity level occurred in 93.4%. Longer instability duration correlated with lower AOFAS gain ($r = -0.23$; $p = 0.043$). Complications occurred in 7.8% of cases, mostly minor/transient, with no recurrent mechanical instability or reoperation.

Conclusions: Minimally invasive IBA is a safe and effective option for CLAI with excellent mid-term functional recovery. Prospective comparative studies are needed to confirm long-term durability and cost-effectiveness.

Keywords: Joint instability; Arthroscopy; Ankle injuries.

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Mid-term outcomes of all-arthroscopic autologous matrix-induced chondrogenesis for osteochondral lesions of the talus

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Introduction: Open approaches for autologous matrix-induced chondrogenesis (AMIC) in osteochondral lesions of the talus (OLT) may be associated with relevant morbidity. This study aimed to evaluate the effectiveness of the all-arthroscopic technique (AT-AMIC), with a focus on mid-term functional outcomes and complication rates.

Methods: This retrospective multicenter case series included 64 patients (39 men, 25 women; 18-71 years) with symptomatic OLTs confirmed by magnetic resonance imaging, treated with AT-AMIC. The procedure included lesion debridement, subchondral bone microfracture, autologous cancellous bone grafting when needed, and implantation of a porcine bilayer collagen matrix (Chondro-Gide). Functional outcomes were assessed using the AOFAS score, with a mean follow-up of 44 months (31–62). The Wilcoxon test was used, with significance set at 5% ($p < 0.05$).

Results: Mean lesion size was 112 mm^2, with predominance in Raikin zone 4 (54.68%). Mean AOFAS score improved from 51.58 preoperatively to 89.64 at final follow-up ($p < 0.0001$). Seven patients (11%) had treatment failure due to complications, including membrane detachment, membrane hypertrophy, or lesion recurrence. No significant correlation was found between lesion size or symptom duration and clinical outcome.

Conclusions: AT-AMIC is a reproducible method for treating OLTs, with statistically significant mid-term clinical improvement. Further comparative studies are needed to confirm long-term efficacy.

Keywords: Talus; lesions; Arthroscopy.

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Reproducibility of T All-Inside Arthroscopic ATFL Repair With Internal Brace Augmentation: Multicenter Midterm Outcomes in Chronic Lateral Ankle Instability

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Introduction: Chronic lateral ankle instability (CLAI) may require surgery after failed nonoperative care. We evaluated functional outcomes of a true all-inside arthroscopic anterior talofibular ligament (ATFL) repair augmented with suture tape internal brace, and whether concomitant intra-articular lesions or postoperative stiffness influenced results.

Methods: Multicenter retrospective cohort of 51 consecutive CLAI patients treated from March 2021 to September 2023. FAAM, LEFS, MOXFQ and EQ-5D VAS were collected preoperatively and at final follow-up. Paired comparisons used Wilcoxon signed-rank or paired t tests. Subgroup analyses compared patients with/without associated lesions and with/without mild postoperative stiffness.

Results: Mean follow-up was 24 months. All scores improved significantly ($p<0.001$) with large effect sizes: FAAM 32.97±20.98 to 95.57±6.13 ($d=2.83$); LEFS 44.75±17.21 to 95.95±6.83 ($d=2.83$); MOXFQ 57.11±20.50 to 96.81±6.04 ($d=1.77$); EQ-5D VAS 65.39±15.09 to 92.59±9.92 ($d=1.45$). Patients with concomitant lesions or mild stiffness had slightly lower absolute postoperative scores, but functional gain (Δ) did not differ between subgroups (all $p>0.05$). No recurrence of instability was observed.

Conclusions: True all-inside arthroscopic ATFL repair with internal brace augmentation provides substantial functional improvement, high stability and low complications in CLAI, without clinically relevant compromise from concomitant lesions or mild postoperative stiffness.

Keywords: Arthroscopy; Ankle joint; Joint instability.

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Anterior chevron-type tibial osteotomy for treatment of osteochondral lesion of the talus using osteochondral autograft transfer system: A case report and technical description

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Introduction: In the osteochondral autograft transfer system (OATS) procedure, a wide accessible area is required to introduce the femoral plug at varying angles. This may not always be achievable through standard anteromedial or anterolateral arthrotomy approaches. The aim of this case report was to describe the use of an anterior chevron-type tibial osteotomy as a technical approach for treating a centrolateral osteochondral lesion of the talus (OLT) with the OATS technique.

Methods: A 48-year-old female patient with chronic ankle pain following an ankle sprain 32 years ago. The anterior osteotomy was performed with dimensions of 3 cm in width, 2 cm in depth, and 4 cm in height. After removing the anterior tibial bone block, we identified and debrided the OLT. The lesion site was prepared, and a bone plug obtained from the lateral femoral trochlea was inserted, congruent with the surrounding articular cartilage. The temporarily removed anterior tibial bone block was reattached and secured with three cannulated screws.

Results: By 44 months postoperatively, the patient demonstrated significant clinical improvement and had returned to full activity. Preoperatively, she reported a VAS score of 7 for pain, which improved to 1 postoperatively. Her American Orthopaedic Foot and Ankle Society ankle-hindfoot score increased from 41 to 90. Ankle range of motion improved, from a preoperative total of 90 degrees to 100 degrees postoperatively. No complications were observed following the tibial osteotomy or the OATS procedure.

Conclusion: The anterior chevron-type tibial osteotomy provided an adequate exposure of a centrolateral OLT, enabling precise graft positioning during the OATS procedure. It allowed safe insertion of the plug at the desired angle while preserving joint congruity. This technique may represent a surgical option for treating centrally and laterally located OLT when conventional approaches do not provide sufficient access.

Keywords: Osteotomy; Tibia; Cartilage.

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Clinical and functional results of surgical treatment of osteochondral lesions of the talus by matrix-induced autologous chondrogenesis technique (AMIC)

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Introduction: There is still no consensus on the ideal method for treating osteochondral lesions of the talus (OCL). Matrix-induced autologous chondrogenesis (AMIC), with the application of a collagen membrane, aims to enhance cartilage regeneration and promote restoration of the articular surface. This technique has been used as a promising alternative in the management of talar OCLs. The objective of this study was to evaluate the clinical and functional results of the AMIC technique in the treatment of talar OCL and to analyze the association between outcomes and lesion characteristics, procedures performed, and imaging findings at follow-up.

Methods: A retrospective multicenter study that included 36 patients undergoing the AMIC technique. The outcomes evaluated were the AOFAS, VAS scores, and the rate and time of return to physical activities. Area, depth, quadrant, presence of subchondral cyst, and lesion containment were analyzed. Associated procedures, use of bone graft, and surgical approach (open/arthroscopic) were also evaluated. The presence of bone edema or cysts on postoperative magnetic resonance imaging (MRI) was also correlated with clinical outcomes.

Results: The mean age of the patients was 40.69 years, with a mean follow-up of 39.11 months. Significant improvement in AOFAS and VAS scores was observed ($p < 0.001$). The rate of return to physical activity was 83%, with a mean time of 8.6 months. The only significant correlation found was between bone edema on postoperative MRI and lower AOFAS score ($p = 0.033$). The other variables analyzed did not show a significant correlation with the outcomes.

Conclusion: The AMIC technique led to significant clinical and functional improvements, with a high rate of return to physical activities. The characteristics of the lesion and the associated procedures did not influence the results in this patient sample, whereas the persistence of bone edema on MRI was associated with a lower functional score.

Keywords: Talus; Chondrogenesis; Treatment Outcome.

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Clinical and functional results in the surgical treatment of osteochondral lesions of the talus: A comparative study between the matrix-induced autologous chondrogenesis (AMIC) technique isolated and associated with bone marrow aspiration (BMA)

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Introduction: Osteochondral lesions of the talus (OCL) remain a therapeutic challenge, with no consensus on the ideal surgical strategy. Matrix-induced autologous chondrogenesis (AMIC), which uses a collagen membrane, aims to stimulate cartilage regeneration and has shown promise. Bone marrow aspiration (BMA) has been used as an adjuvant to enhance osteochondral repair by offering progenitor cells and growth factors. However, comparative evidence on the clinical impact of this association is still limited. The aim of this study was to compare the clinical and functional outcomes of AMIC alone versus AMIC + BMA.

Methods: A retrospective multicenter study comparing two groups: AMIC alone (n = 39) and AMIC + BMA (n = 39). The outcomes evaluated included AOFAS, VAS, rate and time of return to activities, and the presence of residual limitations in physical activities and daily living. Lesion characteristics (area, depth, quadrant, and presence of subchondral cyst) were analyzed, as well as associated procedures, use of bone graft, and surgical approach (open or arthroscopic).

Results: Improvement in AOFAS and VAS scores was significantly greater in the AMIC + BMA group ($p < 0.001$). However, the rate and time of return to activities were similar between groups ($p = 0.076$ and $p = 0.301$). A higher frequency of postoperative residual limitations for physical activities and daily living was observed in the AMIC + BMA group ($p = 0.006$).

Conclusion: Both techniques promoted significant clinical improvement in the treatment of talar OCL. The AMIC + BMA association was related to greater functional gain and greater pain reduction when analyzed by score variation. However, there was no difference in return to activities, and the AMIC + BMA group had a higher frequency of residual functional limitations, suggesting that any potential biological benefit should be interpreted with caution.

Keywords: Talus; Chondrogenesis; Treatment outcome.

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Postoperative evaluation of the treatment of chronic ankle ligament instability: Broström Gould vs Arthroscopic Brostöm – 10 years of follow-up

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Introduction: Ankle sprain is one of the most frequent ligament injuries in the lower limbs, with a high prevalence in athletes. Although conservative treatment is effective for most patients, about 20% develop chronic instability and may require surgical intervention. The modified Broström-Gould technique is considered the gold standard, while the arthroscopic Arthro-Brostrom technique appears as a minimally invasive alternative. This study aims to functionally compare the outcomes of both techniques with a 10-year follow-up, using the AOFAS scale.

Methods: This is a retrospective longitudinal study comparing two treatment groups that evaluated 113 patients with chronic lateral ankle ligament instability, operated between January 2011 and December 2014, divided into two groups: modified Broström-Gould (n = 46) and Arthro-Broström (n = 67). All had previously undergone conservative treatment for at least six months. The AOFAS score was applied pre- and postoperatively.

Results: There was no statistically significant difference between the groups regarding clinical characteristics. Both groups showed a significant increase in the postoperative AOFAS score ($p < 0.001$), with a mean improvement of 38.6 points for Broström-Gould and 39 points for Arthro-Broström. The final mean score was slightly higher in the Arthro-Broström group (92.1 vs. 91.4), but there was no statistically significant difference between the methods ($p = 0.847$).

Conclusion: Both the modified Broström-Gould and Arthro-Broström techniques proved to be effective for the treatment of chronic ankle instability, providing significant functional improvement and a low rate of complications. The arthroscopic approach showed advantages, including lower morbidity and improved visualization of associated lesions, making it a safe and effective option.

Keywords: Arthroscopy; Joint Instability; Ankle.

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Combined multi-ligament instability in patients with chronic symptoms following rotational ankle injuries. A prospective cohort study

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Introduction: To prospectively quantify isolated versus combined ligamentous instability in symptomatic patients after rotational ankle injuries (RAI) and assess changes in patient-reported outcomes (PROs) after targeted surgical stabilization.

Methods: Adults with pain and/or subjective instability > 6 months after RAI who failed ≥ 3 months of nonoperative care were enrolled in a prospective cohort. All underwent diagnostic ankle arthroscopy and open stabilization based on standardized intraoperative criteria for lateral, syndesmotic, and deep deltoid instability; combined patterns were classified. PROs (VAS pain, EFAS, PCS, PROMIS-PF, and PROMIS-PI) were obtained preoperatively and at follow-up.

Results: Twenty-nine patients (30 ankles; age 36.1 years, BMI 31.2 kg/m2) were included; 90% followed a sprain and 10% fractures. The interval from injury to surgery was 58.4 months; the mean follow-up was 45.2 months. Instability prevalences were lateral 97%, syndesmotic 77%, and deep deltoid 83% (72% anterior, 28% combined anterior/posterior). Instability patterns were multidirectional (lateral/deltoid/syndesmotic) in 60%, rotational (lateral/deltoid) in 20%, anterolateral (lateral/syndesmotic) in 13%, and anteromedial (deltoid/syndesmotic) in 3.5%; isolated lateral instability occurred in 3.5%. Significant improvement ($p < 0.04$) in VAS (4.7 to 2.3), EFAS (6.2 to 9.5), PROMIS-PF (38.2 to 44), PROMIS-PI (62.1 to 54.8), and PCS (17.8 to 9.4) were noted. Three complications occurred (two minors, one major), all resolved after treatment.

Conclusion: In symptomatic patients after RAI, multi-ligament ankle instability predominated, most commonly multidirectional or rotational patterns. Arthroscopy-guided comprehensive stabilization yielded significant improvements in PROs with a low complication rate. Systematic assessment for combined instability is warranted, and larger comparative studies should validate these findings.

Keywords: Sprains and strains; Instability.

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Medial and lateral osteochondral lesions of the talus treated with double AT-AMIC using a biological scaffold

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Introduction: Osteochondral lesions of the talus (OLT) are challenging due to poor cartilage healing and the talus's role in ankle biomechanics. Biological augmentation may improve outcomes. Simultaneous bilateral treatment is rarely reported. This report describes the feasibility and early outcomes of one-stage bilateral arthroscopic OLT treatment.

Methods: A 47-year-old man with bilateral OLT and no comorbidities underwent simultaneous bilateral ankle arthroscopy with debridement, microfracture, and implantation of a type I/III collagen scaffold fixed with fibrin glue. Both ankles were immobilized for six weeks, followed by rehabilitation.

Results: At three months, the patient showed marked pain reduction, improved range of motion, and functional recovery, with no perioperative or postoperative complications.

Conclusions: Simultaneous bilateral arthroscopic treatment of OLT with microfracture and collagen scaffold appears feasible and safe in selected patients, with potential clinical and logistical advantages.

Keywords: Talus; Lesion; Arthroscopy.

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Operative versus nonoperative treatment for acute Achilles tendon rupture: a meta-analysis of randomized controlled trials

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Introduction: Acute Achilles tendon rupture is a frequent and disabling injury. When early functional rehabilitation protocols are standardized, the independent effect of surgical versus nonoperative management on rerupture and complications remains unclear, as does the influence of surgical technique.

Methods: A systematic review and meta-analysis of parallel-group randomized controlled trials was performed, including adults with acute (≤ 14 days), unilateral, closed Achilles tendon rupture. Nonoperative management with functional bracing and early rehabilitation was compared with open or minimally invasive surgical repair, with both groups following equivalent rehabilitation protocols. Searches of PubMed, Embase, and Cochrane were conducted following PRISMA guidelines. Primary outcomes at 12 months were rerupture and complications, including deep infection, superficial infection, and sural nerve injury. Risk ratios were pooled using a random-effects model, with prespecified subgroup analyses by surgical technique.

Results: Seven randomized controlled trials, including 1,003 patients, were analyzed; 410 underwent nonoperative treatment and 593 surgical repair (410 open, 183 MIS). Nonoperative management was associated with a significantly higher 12-month rerupture rate than surgery (RR 3.35; 95% CI 1.35–8.30). No significant differences were observed in deep or superficial infection rates. Sural nerve injury was significantly less frequent in the nonoperative group (RR 0.20; 95% CI 0.05-0.85). Subgroup analysis showed persistently higher rerupture rates with nonoperative treatment than with open surgery, while superficial infection rates were lower in the nonoperative group.

Conclusion: When early functional rehabilitation is standardized, surgical repair reduces the risk of rerupture at 12 months, whereas nonoperative management is associated with fewer sural nerve injuries. Treatment selection should be individualized based on patient-specific risks and priorities.

Keywords: Achilles Tendon; Conservative treatment; Surgery.

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Epidemiological analysis of stress fractures in runners

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Introduction: Stress fractures represent an important cause of sports absence in runners and result from the interaction between repetitive mechanical overload and biological capacity for bone remodeling. In Brazil, there is a shortage of epidemiological data that integrates intrinsic and extrinsic factors in risk analysis. Thus, this study aimed to investigate the incidence and multifactorial determinants of stress fractures among Brazilian runners, analyzing interactions between intrinsic (biological, metabolic, and biomechanical) and extrinsic factors (training load, equipment, and training location).

Methods: Cross-sectional observational study approved by the Research Ethics Committee, including 230 runners linked to sports advisory services, with a minimum training frequency of twice a week. The collection took place electronically, via email, and was disseminated to groups of amateur runners. Demographic, anthropometric, clinical, training-related, and metabolic health variables were evaluated.

Results: The overall self-reported incidence was 26.5%, with a higher prevalence among females (37.2%) than males (16.2%). The tibia was the most affected site (42.6%), followed by metatarsals (21.3%) and femur (11.5%). Running experience of more than three years and persistent pain during training were independent predictors. Regular practice of strength training proved to be a protective factor. In women, low BMI, high weekly volume, and amenorrhea were associated with a significantly higher risk.

Conclusion: Stress fractures in Brazilian runners have a multifactorial character. The interaction between female gender, low BMI and metabolic impairment showed greater relevance than mechanical load alone. The findings reinforce the need for integrated preventive strategies, including load control and metabolic, hormonal and nutritional screening.

Keywords: Fractures, stress; Metabolism.

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Effects of calcaneo-stop arthroereisis on joint kinematics during simulated walking: a cadaver study

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Introduction: The calcaneo-stop procedure is a form of arthroereisis designed to limit valgus motion at the subtalar joint in progressive collapsing foot deformity. Although more frequently used in pediatric patients, it has also been performed in adults despite limited biomechanical evidence. This study evaluated the effect of the calcaneo-stop procedure on hindfoot kinematics during simulated level walking in a cadaveric deformity model. We hypothesized that the procedure would restore subtalar and talonavicular motion toward intact patterns.

Methods: Eight cadaveric distal tibia and foot specimens were mounted in a six-degree-of-freedom robotic system that simulated the stance phase of gait. Four conditions were tested: intact, simulated deformity, calcaneo-stop with the screw head at the subtalar joint line, and calcaneo-stop with the screw head positioned above the joint line. Reflective markers placed in the talus, calcaneus, and navicular were tracked by infrared cameras to calculate subtalar and talonavicular rotational kinematics. Bias-corrected bootstrapped 95% confidence intervals were used for comparisons.

Results: The simulated deformity increased subtalar eversion and talonavicular abduction. With the screw at the joint line, subtalar eversion decreased by 3.8° in early stance, resulting in a 1.5° undercorrection relative to intact. Talonavicular abduction decreased by 4.9°, with a 1.4° undercorrection. When the screw was positioned above the joint line, eversion decreased by 6.2°, producing a 2.4° vercorrection, and talonavicular abduction decreased by 6.9°, with a 2.5° overcorrection.

Conclusion: The procedure shifted kinematics toward intact values, but superior screw placement led to overcorrection. Accurate intraoperative positioning appears essential, and further clinical studies are necessary to confirm these findings and evaluate complications.

Keywords: Flatfoot; Subtalar joint; Foot deformities.

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Middle facet uncoverage changes after flexible progressive collapsing foot deformity reconstruction

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Introduction: Recent studies have associated the percentage of subtalar middle facet uncoverage with progressive collapsing foot deformity (PCFD). However, its postoperative behavior, relationship with conventional radiographic parameters, and impact on outcomes remain unclear. This study evaluated postoperative correction of middle facet uncoverage, its correlation with standard two-dimensional measures, and its association with minimum two-year patient-reported outcomes.

Methods: We performed a retrospective review of prospectively collected data from patients undergoing reconstruction for flexible deformity with pre- and postoperative weight-bearing computed tomography (WBCT) scans and baseline and minimum two-year PROMIS scores. Hindfoot fusions were excluded. Thirty-six patients met the criteria. Middle facet uncoverage and foot and ankle offset were measured on WBCT. Hindfoot moment arm and talar lateral incongruency angle were obtained from standard weight-bearing radiographs. PROMIS Physical Function, Pain Intensity, and Pain Interference were recorded at two years. Pre- and postoperative uncoverage were compared using t-tests. Spearman correlation with bootstrapped confidence intervals assessed associations among imaging parameters and outcomes.

Results: Mean uncoverage improved from 31.1 percent preoperatively to 22.5 percent postoperatively, demonstrating significant correction. Preoperative values moderately correlated with postoperative uncoverage, and higher baseline uncoverage was associated with greater improvement. No meaningful correlations were found between uncoverage and foot and ankle offset, hindfoot moment arm, or talar lateral incongruency angle. Postoperative uncoverage did not correlate with two-year PROMIS scores, and patients with corrections below 17.9% did not demonstrate superior outcomes.

Conclusion: Surgery improves middle facet uncoverage, but this parameter was not associated with radiographic alignment measures or patient-reported outcomes at two years.

Keywords: Weight-bearing; Flatfoot; Computed tomography.

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Reliability and temporal stability of the Van Dijk-Asaumi method for measuring backfoot alignment

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Introduction: Rear foot deformities are associated with pain, instability, and joint degeneration, with kinetic repercussions throughout the lower limb, making their quantitative evaluation fundamental. This study aimed to evaluate the interobserver reliability and temporal stability of a new proposed method for measuring the coronal alignment of the hindfoot.

Methods: Cross-sectional, analytical, and prospective study, including 42 adults without apparent clinical deformities in the feet. Loaded radiographs were performed in the anteroposterior, lateral, and long axial views of the calcaneus. The alignment of the hindfoot was measured using the Van Dijk–Asaumi method, a new approach proposed by four evaluators with varying levels of experience. Interobserver and test-retest reliability were analyzed using the intraclass correlation coefficient (ICC). The standard error of measurement (SEM), minimum detectable difference (MDD), Bland-Altman analysis, and Lin coefficient of agreement were also calculated.

Results: Interobserver reliability was moderate, between 0.54 and 0.61. The test-retest reliability showed high temporal stability (ICC between 0.57 and 0.61). The SEM was low (0.12°-0.14°), with MDD less than 0.4°. The Bland-Altman analysis showed practically no bias and narrow limits of agreement. The Lin coefficient indicated almost perfect agreement (0.996-0.997).

Conclusions: The new method exhibited low measurement error, excellent temporal stability, and high global agreement, making it a practical, objective, and reliable alternative for quantitative evaluation of hindfoot alignment in clinical practice.

Keywords: Reproducibility of results; Calcaneus; Foot.

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Comparison of isolated and combined osteotomies on progressive collapsing foot deformity correction: A cadaveric study

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Introduction: Lateral column lengthening (LCL), medial displacement calcaneal osteotomy (MDCO), and cotton osteotomy (CO) are commonly used to treat progressive collapsing foot deformity (PCFD). However, the correction achieved by isolated or combined procedures is poorly defined, and surgical planning remains largely empirical. The biomechanical effects of osteotomy magnitude are also debated, with limited data correlating the size of the correction with alignment. This study aimed to compare the three-dimensional correction produced by isolated and combined LCL, MDCO, and CO in a cadaveric model. We hypothesized that combining procedures would enhance overall alignment correction.

Methods: Twelve cadaveric legs without deformity were mounted under 75 kg axial load with physiological tendon tension. Weight-bearing CT (WBCT) scans were obtained preoperatively. Small, intermediate, and large corrections were performed for each osteotomy. Combinations of two procedures and all three procedures were subsequently executed. Foot and ankle offset (FAO) was measured after each WBCT acquisition.

Results: All osteotomies significantly influenced FAO ($p < 0.05$). As isolated procedures, LCL, MDCO, and CO decreased FAO by 0.36%, 0.8%, and 0.29% per millimeter, respectively. Increasing correction magnitude produced progressive alignment improvement ($p < 0.05$). Two-procedure combinations decreased FAO by 3.9%-7.2% with no significant differences among them ($p = 0.226$). Combining all procedures resulted in FAO reductions of 5.2%-14.2%, with significant differences between groups ($p = 0.002$).

Conclusion: MDCO produced the greatest isolated correction. Increasing osteotomy magnitude resulted in a gradual improvement in alignment. While two-procedure combinations had similar effects, maximal correction was achieved when all procedures were combined with larger displacements. These findings may help guide surgical planning in PCFD.

Keywords: Flatfoot; Osteotomy; Foot deformities.

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Surgical correction of flat foot due to posterior tibial muscle tendon injury: case report

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Rupture of the posterior tibial tendon (PTT) is the main cause of acquired flatfoot in adults, commonly treated by transfer of the flexor digitorum longus (FDL) tendon. This study aims to report and describe the surgical application of a poorly documented technique: PTT reconstruction using hamstring autografts to treat stage II flatfoot deformity in a patient who suffered low-energy trauma. This is a case report of a 44-year-old female patient with a complete rupture of the retromalleolar portion of the PTT after ankle sprain. Surgical treatment involved a combined approach (open and arthroscopic) using grafts from the semitendinosus and gracilis tendons. The technique included Pulvertaft tenorrhaphy, fixation to the navicular bone with an interference screw, and retinaculum reconstruction. The surgery provided satisfactory correction of the plantar arch, as evidenced by the immediate formation of a medial cavus and confirmed by podoscopy in the postoperative period. The patient presented preservation of dorsiflexion and inversion movements, absence of pain during ambulation, and satisfactory balance. Only temporary plantar paresthesia was observed due to the neurolysis required during the procedure. Reconstruction with hamstring autograft showed favorable results in the treatment of stage II flatfoot secondary to PTT rupture. Despite the technique's potential, the literature still lacks sufficient studies to establish a definitive consensus on its application.

Keywords: Flatfoot; Tendon transfer; Treatment outcome.

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Risk factors for metatarsal fracture in minimally invasive hallux valgus surgery: A case-control study

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Introduction: Minimally invasive hallux valgus (HV) correction techniques, including percutaneous Chevron-Akin (PECA) and metaphyseal extra-articular transverse and Akin (META) osteotomies, offer favorable outcomes but are associated with unpredictable metatarsal fractures. This study identifies predictive factors for first metatarsal fractures following minimally invasive HV surgery.

Methods: This retrospective case-control study analyzed 370 patients (499 feet) who underwent minimally invasive HV correction between November 2017 and August 2024 at a tertiary orthopedic center. Cases from the learning curve, revision procedures, and patients lost to follow-up were excluded. Patients were classified by the presence or absence of a first metatarsal fracture, and logistic regression was conducted to identify associated risk factors.

Results: First metatarsal fractures occurred in 5.4% (27/499 feet), with Type II fractures being most common (40.7%). On multivariable logistic regression, both older age and simultaneous bilateral surgery were independently associated with fracture. The odds of fracture increased by 8.6% per year of age (OR 1.086, 95% CI 1.032-1.150, p = 0.003) and were higher in patients undergoing bilateral vs unilateral surgery (OR 4.02, 95% CI 1.75-9.80, p = 0.001). Bone mineral density (BMD) of the femur and lumbar spine was not associated with fracture risk.

Conclusion: Advanced age and bilateral surgery are key predictive factors for metatarsal fractures following minimally invasive hallux valgus correction. Tailoring surgical and postoperative strategies, especially in elderly patients, may help mitigate fracture risk. Further research should explore metatarsal-specific bone density, surgical biomechanics, and younger patient cohorts.

Keywords: Hallux valgus; Metatarsal bones; Minimally invasive surgical procedures.

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Minimally invasive surgery in the correction of recurrent hallux valgus: a case series with 2 year followup

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Introduction: Recurrent deformity following surgical correction remains a complex and technically demanding condition. This study aimed to evaluate the clinical and radiographic outcomes of minimally invasive surgery (MIS) in patients undergoing revision procedures for recurrent hallux valgus (HV).

Methods: This retrospective case series included 33 feet that underwent minimally invasive revision surgery using either the third-generation minimally invasive Chevron-Akin (MICA) or the fourth-generation Metaphyseal Extra-Articular Transverse and Akin osteotomies (META), following failure of a previous HV correction performed by open or MIS. Clinical outcomes were assessed using the Manchester-Oxford Foot Questionnaire (MOXFQ), the visual analog scale (VAS) for pain, and patient satisfaction. Radiographic parameters and complications were recorded and statistically analyzed using R software.

Results: Both techniques proved effective in angular correction, with significant reductions in the hallux valgus angle (HVA) and intermetatarsal angle (IMA) ($p < 0.001$), as well as in bone and soft-tissue forefoot width ($p < 0.05$). Significant improvements were also observed in all three MOXFQ domains ($p < 0.001$) and in VAS scores ($p < 0.001$). Subgroup analysis revealed no statistically significant differences between MICA and META in either radiographic or clinical outcomes related to pain and function ($p > 0.05$).

Conclusion: Third- and fourth-generation minimally invasive surgical techniques have proven effective in correcting radiographic parameters and improving pain and functional scores in patients undergoing revision for recurrent hallux valgus, with a low rate of complications.

Keywords: Hallux valgus; Osteotomy; Minimally invasive surgical procedures.

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Evaluation of the Percutaneous Bianchi System technique in the treatment of hallux valgus: 5 years of follow-up

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Introduction: Recurrent deformity following surgical correction remains a complex and technically demanding condition. This study aimed to evaluate the clinical and radiographic outcomes of minimally invasive surgery (MIS) in patients undergoing revision procedures for recurrent hallux valgus (HV).

Methods: This retrospective case series included 33 feet that underwent minimally invasive revision surgery using either the third-generation minimally invasive Chevron-Akin (MICA) or the fourth-generation Metaphyseal Extra-Articular Transverse and Akin osteotomies (META), following failure of a previous HV correction performed by open or MIS. Clinical outcomes were assessed using the Manchester-Oxford Foot Questionnaire (MOXFQ), the visual analog scale (VAS) for pain, and patient satisfaction. Radiographic parameters and complications were recorded and statistically analyzed using R software.

Results: Both techniques proved effective in angular correction, with significant reductions in the hallux valgus angle (HVA) and intermetatarsal angle (IMA) ($p < 0.001$), as well as in bone and soft-tissue forefoot width ($p < 0.05$). Significant improvements were also observed in all three MOXFQ domains ($p < 0.001$) and in VAS scores ($p < 0.001$). Subgroup analysis revealed no statistically significant differences between MICA and META in either radiographic or clinical outcomes related to pain and function ($p > 0.05$).

Conclusion: Third- and fourth-generation minimally invasive surgical techniques have proven effective in correcting radiographic parameters and improving pain and functional scores in patients undergoing revision for recurrent hallux valgus, with a low rate of complications.

Keywords: Hallux valgus; Weight-bearing; Metatarsophalangeal joint; Metatarsal bones.

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Reduction of fluoroscopic images by percutaneous anatomical marking with needles: A strategy for optimizing radiological safety in minimally invasive forefoot surgery

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Introduction: Percutaneous foot and ankle surgery relies heavily on fluoroscopy to guide osteotomies and fixations. Repeated use of radioscopy increases occupational exposure to ionizing radiation, especially during more complex procedures and the learning curve. We propose an anatomical marking technique that uses radiopaque needles to reduce the number of fluoroscopic images while maintaining three-dimensional accuracy and proper alignment.

Methods: After standard positioning and preparation, 25 x 7 mm needles are inserted percutaneously at anatomical points corresponding to osteotomies or screw paths. Radioscopy is performed with the team away to confirm positioning. After validation, the references are transferred onto the skin with methylene blue, and the enhancer is removed from the field. Osteotomies and fixations are performed under the guidance of previously confirmed markings, thereby avoiding repetitive dynamic fluoroscopy.

Results: The technique demonstrated high precision in the positioning of osteotomies and fixation paths. In percutaneous HV corrections, a mean of 6-8 images was required, while usual techniques often require 15-30 images throughout the procedure. In isolated metatarsal osteotomies, only two images were sufficient, a number significantly lower than the conventional standard. As the initial confirmation occurs with the away team, there is no direct exposure during the images, reducing the annual cumulative radiation load.

Conclusion: The technique is a simple, reproducible, and low-cost strategy to optimize surgical precision and significantly reduce occupational radiation exposure in percutaneous foot and ankle surgery.

Keywords: Fluoroscopy; Hallux valgus; Minimally invasive surgical procedures.

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Bunionectomy inside-out: Intracortical medial exostectomy during minimally invasive hallux valgus correction

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In this technical report, we describe an intracortical "inside-out" technique for percutaneous medial exostectomy performed as a final step during modern minimally invasive hallux valgus correction. Contemporary third-generation minimally invasive Chevron-Akin (MICA/PECA) and fourth-generation metaphyseal extra-articular transverse constructs (META) provide powerful multiplanar correction with rigid fixation. However, residual medial bony prominence following distal fragment translation may persist and contribute to postoperative medial irritation. Traditional percutaneous exostectomy is commonly performed in an outside-in fashion and may increase the risk of capsular trauma or inadvertent articular injury when performed close to the first metatarsophalangeal (MTP) joint. Our technique uses the same 2.0-2.2 mm Shannon burr employed for the metatarsal osteotomy, introduced intraosseously through a minimal cortical entry. The medial prominence is progressively resected from cancellous bone toward the medial cortex under fluoroscopic and tactile guidance, while maintaining an outward safety vector away from the articular surface. We hypothesize that this approach provides a reproducible method to contour residual medial prominence while preserving medial capsuloligamentous structures.

Keywords: Hallux valgus; Minimally invasive surgical procedures; Osteotomy.

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Is it necessary to fix the Akin osteotomy in the minimally invasive hallux valgus correction? Prospective randomized controlled trial with a minimum follow-up of two years

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Introduction: The need for fixation of Akin osteotomy associated with minimally invasive hallux valgus correction remains controversial.

Methods: Consecutive patients undergoing minimally invasive hallux valgus correction with Akin osteotomy were randomized to two treatment arms. Outcomes were collected before the procedure and at the final assessment (at least 2 years later). Pre-versus-post comparisons were performed using a paired t-test or a Wilcoxon test, according to the distribution of paired differences (two-tailed alpha = 0.05).

Results: Forty-six [AC1] participants (23 in group 1, 22 in group 2) were included; pain (VAS) decreased from a median of 7 to 0 ($p < 0.001$), and the AOFAS score increased from 60.5 ± 8.3 to 93.2 ± 7.4 ($p < 0.001$). Radiographic correction was significant: HVA decreased from 32° to 6° ($p < 0.001$) and IMA from 14.3 ± 2.9° to 6.6 ± 1.8° ($p < 0.001$). The IMA showed no statistically significant change (7.6 ± 4.4° to 9.8 ± 6.0°; $p = 0.059$). In the final evaluation, consolidation of Chevron and Akin was observed in all cases. The mean follow-up was 31.2 months.

Conclusion: In this prospective randomized controlled trial, there was significant clinical improvement and sustained radiographic correction at the end of two years, with high consolidation and satisfaction rates.

Keywords: Hállux valgus; Osteotomy; Minimally invasive surgical procedures.

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Reverdin-Isham modified vs MICA for moderate hallux valgus: A comparative study

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Introduction: Minimally invasive surgery has emerged as a promising alternative in the treatment of hallux valgus (HV); however, the literature lacks direct comparisons between percutaneous techniques. The purpose of this study is to compare the clinical, functional, and radiographic outcomes of the Modified Reverdin-Isham (RImod) and minimally invasive Chevron-Akin (MICA) techniques in the treatment of moderate VH.

Methods: Retrospective comparative study of 81 feet (38 MICA, 43 RImod) with moderate hallux valgus (IMA ≤ 18°, HVA ≤ 40°). Pre- and postoperative evaluations (6 months) included the AOFAS score, intermetatarsal angles (IMA) and hallux valgus angle (HVA), and fibular sesamoid subluxation. Statistical analysis used Student's t-test and Wilcoxon's t-test, with adjustment for bilateral testing.

Results: Both groups demonstrated significant improvement ($p < 0.001$) in AOFAS (MICA: 37.9 ± 12.6 → 90.95 ± 8.1; RImod: 40.47 ± 13.1 → 93.4 ± 6.5), IMA (MICA: 14.9 ± 2.1° → 10.0 ± 3.0°; RImod: 14.4 ± 2.1° → 10.0 ± 2.8°), HVA (MICA: 31.3 ± 6.1° → 11.8 ± 5.7°; RImod: 29.0 ± 5.8° → 11.0 ± 4.4°) and fibular sesamoid recentralization (MICA: 89% → 53%; RImod: 82% → 51 %). There was no statistically significant difference between the techniques for functional gain ($p = 0.98$), IMA correction ($p = 0.43$), HVA ($p = 0.30$), or sesamoid recentralization ($p = 0.41$). The complication rate was 21.1% for MICA and 9.3% for RImod ($p = 0.149$), with a distinct profile: MICA was associated with implant complications and recurrence, while RImod was associated with nerve injury and malunion.

Conclusion: RImod and MICA are effective for the correction of moderate hallux valgus, with comparable clinical and radiographic results. MICA allows greater angular correction of the IMA but carries a risk of complications related to the synthesis material; RImod eliminates this risk and has a lower complication rate. The surgical decision must be individualized.

Keywords: Hálux valgus; Minimally invasive surgical procedures; Osteotomy.

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Analysis of hypermobility of the first metatarsal in hallux valgus deformity: A weight bearing Computed tomography study

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Introduction: The hypermobility of the first ray has been investigated as a possible contributing factor to hallux valgus, but its precise relationship with the condition has not yet been fully clarified. Weight-bearing computed tomography allows us to assess the foot in a three-dimensional and loaded manner, helping us better understand hypermobility. This study aims to evaluate the hypermobility in the sagittal plane of the first metatarsal in individuals with hallux valgus and hypermobility using weight-bearing computed tomography.

Methods: In this prospective study patients with hallux valgus deformity were recruited.The main inclusion criteria were women above 18 years old with hallux valgus, and the main exclusion criteria were other foot and ankle diseases, reumatologic disease, non-idiopatic hallux valgus and disability/contraindication to perform a CT scan. In total 36 patient were confirmed eligible and were imaged by WBCT in a loaded and non-loaded condition. Angular measurements were obtained by using semi-automated software, were we segmented the bones and analyzed the mobility of the first ray bones in three planes of motion.

Results: Although the group with hallux valgus had a higher average of movement on both planes, there was no statistical difference in the mobility of the first metatarsal in the three planes. We observed similar findings in the other bones of the first ray (medial cuneiform, navicular and talus).

Conclusion: We concluded that the mobility of the first metatarsal is not the direct cause of the hypermobility of the first ray. For further studies we suggest analyzing the combine movement of the bones of the first ray to comprehend the hypermobility, and we recommend a bigger cohort to analyze these small movements.

Keywords: Hallux valgus; Joint instability; Tomography, X-Ray Computed.

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Influence of hallux valgus varus deformity on first metatarsal sagittal inclination assessment: A comparison between weight-bearing radiography and weight-bearing computed tomography

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Introduction: The sagittal inclination of the first metatarsal (1M) is a key parameter in the evaluation of foot deformities. However, 1M varus in hallux valgus (HV) may cause projection bias on weight-bearing radiographs (WBR). This study evaluated whether HV varus deformity alters the apparent sagittal inclination of the 1M on WBR. Measurements from lateral WBR were compared with weight-bearing computed tomography (WBCT) measurements aligned with the true longitudinal axis of the 1M. We hypothesized that if varus deviation produces relevant projection bias, sagittal inclination values would differ between WBR and WBCT. This difference would affect surgical planning for 1M realignment in isolated HV and in foot deformities such as progressive collapsing foot deformity (PCFD).

Methods: Eighty-four feet were analyzed, including 42 HV cases (IMA >15°) and 42 controls. A geometric triangle model was applied, considering that the lateral forefoot projection resembles a rectangular scalene triangle, in which perspective changes may affect side lengths and angles. The first metatarsal declination angle (FMDA) and first metatarsal length (L1M) were measured to evaluate the model and to determine whether 1M varus influences differences in sagittal alignment between WBR and WBCT.

Results: FMDA demonstrated no significant differences within or between groups, with a mean difference of 0.39° ($p = 0.98$). Conversely, L1M differed significantly between imaging modalities and between HV and controls, with a mean difference of 2.48 mm ($p < 0.05$). Agreement analysis revealed strong concordance between WBR and WBCT, indicating minimal systematic bias.

Conclusion: Although geometric changes affected L1M measurements, they did not influence sagittal inclination as assessed by FMDA. The strong agreement between WBR and WBCT supports FMDA as a reliable parameter for evaluating 1M sagittal alignment and planning realignment procedures. WBR-based FMDA assessment appears sufficient for surgical planning, reducing the need for WBCT.

Keywords: Hallux valgus; Radiography; Observer variation.

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Relationship of first metatarsal pronation correction with sesamoid bone reduction and intermetatarsal angle following the modified Lapidus procedure: A weight-bearing computed tomography analysis

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Introduction: Hallux valgus (HV) is a complex deformity characterized by multiplanar and complex displacement of the first metatarsal (1M). The modified Lapidus procedure (MLP) is a technique that provides a mechanical advantage through a longer lever arm, allowing for a more powerful and precise correction of the HV deformity's tridimensional components. This study aimed to investigate the relative correlation between 1M pronation correction following the MLP and improvements in 1M varus alignment and sesamoid bone (SB) reduction, as assessed by weight-bearing computed tomography (WBCT). Given that HV is a multiplanar deformity, our hypothesis was that improvement in 1M pronation would be associated with improvements in SB alignment and intermetatarsal angle (IMA) following MLP.

Methods: A prospective cohort study that included 14 patients (14 feet) with HV deformity surgically treated with the MLP. WBCT variables related to the multiplanar and complex realignment of HV deformities were prospectively evaluated, including the Alpha angle to assess 1M pronation, the IMA to assess 1M varus alignment, and both sesamoid position (SP) and sesamoid rotation angle (SRA) to evaluate SB reduction. All variables were assessed and compared between the preoperative and postoperative settings. Additionally, correlation analysis was performed between the Alpha angle and the IMA, SP, and SRA to investigate the relationship between 1M pronation and HV correction parameters.

Results: The mean age of the patients was 58.64 (36-75) years, and the mean postoperative follow-up was 9.42 (6-12) months. All WBCT measurements demonstrated significant postoperative improvement ($p < 0.001$). A positive correlation was observed only between the Δ-Alpha angle and the Δ-SRA ($p = 0.046$).

Conclusion: The observed association between improvement in 1M pronation and SB derotation measurements suggests that rotational realignment alone may be insufficient to achieve complete correction of the varus of the 1M and full sesamoid reduction.

Keywords: Hallux valgus; Pronation; Treatment outcome.

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Lesser metatarsals load after minimally invasive surgery for hallux valgus correction: a finite element model

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Introduction: Minimally invasive Chevron-Akin (MICA) surgery is a popular treatment for hallux valgus (HV) correction. Our objective was to analyze the biomechanical consequences on the lesser metatarsals using different screw configurations for MICA osteotomy fixation through the finite element method (FEM).

Methods: An FEM model was developed from computed tomography (CT) data of a moderate HV deformity. Five different screw configurations were tested: Group 1, one intramedullary and one bicortical screw; Group 2, two intramedullary screws; Group 3, two bicortical screws; Group 4, one intramedullary screw only; and Group 5, one bicortical screw only. Maximum stress in the lesser metatarsals was measured for each screw configuration under physiological and supraphysiological loading conditions.

Results: The lesser metatarsals experienced the lowest loads when the first metatarsal osteotomy was fixed with one intramedullary and one bicortical screw, with tensile stress values ranging from 30 to 70 MPa under physiological loads and from 50 to 350 MPa under supraphysiological loads. Across all fixation techniques, the second and fourth metatarsals sustained the highest loads, particularly in Groups 3 (two bicortical screws) and 5 (one bicortical screw only), reaching up to 230 MPa and 600 MPa under physiological and supraphysiological loads, respectively. Regardless of the fixation technique, the region of the lesser metatarsals that experienced the highest load was the diaphysis.

Conclusion: After MICA surgery for HV correction, increased tensile stresses were observed in the lesser metatarsals, mainly in the second and fourth. Fixation of the first metatarsal with one bicortical and one intramedullary screw resulted in the lowest stresses in the lesser metatarsals. Additionally, under both physiological and supraphysiological loads, stresses were primarily concentrated in the metatarsal diaphysis, regardless of the fixation technique.

Keywords: Hallux valgus; Minimally invasive surgical procedures; Finite element analysis.

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Kirschner wires versus cannulated screws for hallux valgus correction (bunion) through the minimally invasive Chevron-Akin technique: A two-year randomized controlled trial

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Introduction: Hallux valgus (HV) is a painful lateral deviation of the great toe and medial deviation of the first metatarsal of the foot, affecting almost 20% of the general population. Minimally invasive surgery can correct the deformity using cannulated screws or Kirschner wires. This trial evaluated the efficacy and safety of the two fixation methods with a two-year follow-up.

Methods: This was a randomized, open and parallel clinical trial, conducted in a single orthopedic hospital, with a superiority framework. We randomized 40 adult patients with moderate to severe HV to be operated on using K-wires or cannulated screws for fixation. Patients allocated to K-wires group returned in six weeks for wire removal (which prevented blinding). We evaluated function and radiographic HV correction as primary outcomes, and pain, satisfaction, degenerative changes in two years, and adverse effects secondarily. Brazilian Registry of Clinical Trials (ReBEC) RBR-107ynv85.

Results: From 2021 to 2022, 64 patients were admitted for HV surgery and 40 were randomized. We lost 6 patients for follow-up, 3 in each group. All radiographic outcomes changed positively across time, with no significant difference between groups. Function and pain scores also improved, with function scores higher in the K-wires group at 6, 12, and 24 months ($p < 0.001$). There was no relevant degeneration at 24 months. Of the 7 adverse events registered, 6 were in the cannulated screws group.

Conclusions: No significant difference was found between the two implants regarding clinical, radiographic, safety, functional, and late degenerative outcomes.

Keywords: Hallux valgus; Bunion; Mica, Minimally Invasive Surgical Procedures.

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Bone mineral density in ankle arthritis and deformity: A WBCT scan case control study

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Introduction: Bone mineral density (BMD) influences surgical decision-making in ankle arthritis, especially in total ankle replacement. Understanding how arthritis and deformity affect bone quality may help optimize implant selection and fixation. However, no prior study has directly compared BMD between arthritic and non arthritic ankles or analyzed the influence of ankle and foot alignment. The aims of this study were to compare BMD in varus arthritic ankles with controls and to investigate the relationship between deformity and BMD. We hypothesized that varus alignment would increase medial BMD and decrease lateral BMD in the tibia and talus due to asymmetric loading.

Methods: We performed a retrospective review of patients who underwent primary total ankle replacement and had preoperative weight-bearing computed tomography (WBCT). Ankle alignment was measured using the tibiotalar alignment angle, and foot alignment using foot and ankle offset. Tibial and talar BMD were quantified in Hounsfield units using a standardized method. Contralateral non arthritic ankles served as controls. Comparisons were performed using independent samples t-tests. Subgroup analyses compared varus foot alignment and varus ankle alignment with neutral controls. Multiple linear regression was used to assess correlations between BMD and alignment.

Results: No significant differences in tibial or talar BMD were found between varus arthritic ankles and controls. Within patients, talar BMD was higher than tibial BMD. Regression analysis demonstrated significant correlations between talar BMD and varus alignment, while tibial BMD showed no association with deformity.

Conclusion: This study demonstrates that talar, but not tibial, BMD correlates with varus deformity. These findings improve understanding of bone adaptation in ankle arthritis and may assist surgical planning.

Keywords: Bone mineral density; Weight-Bearing; Tomography, X-Ray Computed; Ankle; Arthritis.

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Postoperative medial gutter impingement following primary total ankle arthroplasty: A retrospective case-control study

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Introduction: Medial impingement is a common cause of reoperation after total ankle arthroplasty, but evidence regarding its risk factors is limited. Proposed causes include varus malalignment, oversized implants, talar internal rotation or medial translation, and joint line elevation. This case-control study evaluated factors associated with post-arthroplasty medial impingement and the effect of talar component downsizing. We hypothesized that joint line elevation and talar medial translation or internal rotation would increase risk, while downsizing would be protective.

Methods: We reviewed 1,133 primary ankle arthroplasties performed between 2013 and 2022. Revision cases and arthrodesis takedowns were excluded. Thirty-four patients who underwent revision for medial impingement were identified and matched to 115 controls. Radiographic analysis included pre- and postoperative coronal alignment, talar center migration ratio as a measure of medial talar displacement, joint line height ratio as a measure of joint line elevation, and component rotation on WBCT. Logistic regression was used to assess associations between medial impingement and postoperative alignment, talar downsizing, talar center migration ratio, and joint line height ratio.

Results: A total of 3% of arthroplasties required revision for medial impingement. Mean postoperative joint line height ratio was significantly higher in cases, indicating greater joint line elevation. Talar center migration ratio was also higher in cases, consistent with increased medial talar displacement. Talar internal rotation was greater in the impingement cohort. Regression analysis showed that joint line elevation was a significant risk factor, with each 0.2-unit increase associated with a 60% increase in odds. Talar component downsizing reduced the odds of medial impingement by 48%.

Conclusion: Joint line elevation and talar malposition increase the risk of medial impingement, whereas talar downsizing appears protective.

Keywords: Arthroplasty, replacement, ankle; Ankle joint; Arthritis.

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Sagittal alignment may not correlate with the range of motion in ankle arthritis and total ankle replacement

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Introduction: Improving range of motion is a key objective in total ankle replacement, yet factors influencing postoperative mobility remain unclear. As ankle motion occurs mainly in the sagittal plane, this study evaluated the relationship between sagittal tibiotalar alignment and pre and postoperative range of motion. We hypothesized that sagittal alignment parameters would correlate with ankle mobility.

Methods: We conducted a retrospective review of prospectively collected data from primary ankle replacements performed between March 2019 and April 2022 with pre- and postoperative weight-bearing radiographs. Ankle and global range of motion were measured using validated techniques. Sagittal alignment was assessed by two observers using three parameters: pre- and postoperative sagittal tibiotalar ratio, anteroposterior offset ratio, and postoperative tibial implant sagittal slope. Sixty-one ankles were analyzed. Pearson correlation coefficients were used to evaluate associations between alignment and range of motion, with values below 0.4 considered weak. Interobserver reliability was assessed with intraclass correlation coefficients.

Results: Median preoperative sagittal tibiotalar ratio was 36.5, and postoperative was 35.9, indicating minimal change. Mean tibial implant sagittal slope was 88.5°, with limited variation. No moderate or strong correlations were found between sagittal alignment measures and range of motion. Weak negative correlations were identified between preoperative tibiotalar ratio and plantarflexion offset, and between offset ratio and postoperative dorsiflexion and total range of motion, suggesting that anterior talar position may slightly limit mobility.

Conclusion: Overall, sagittal alignment showed weak or no meaningful association with range of motion in this cohort.

Keywords: Arthroplasty, replacement, ankle; Ankle joint; Arthritis.

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Correcting tibiotalar alignment correlates with foot and ankle offset changes after total ankle replacement

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Introduction: Restoring alignment is critical for outcomes and longevity in total ankle replacement. Foot and ankle offset is a three-dimensional (3D) weight-bearing computed tomography (WBCT) parameter that represents the relationship between the foot tripod and the ankle joint center. Although it correlates with the need for additional procedures, its behavior after isolated ankle replacement remains unclear. This study evaluated the association between changes in tibiotalar alignment and foot and ankle offset, and whether ankle replacement alone improves global alignment.

Methods: We performed a single-institution retrospective review of primary ankle replacements with pre- and postoperative WBCT obtained between four and 12 months after surgery. Patients undergoing concomitant foot osteotomy or fusion were excluded. Of 85 ankles with complete imaging, 55 met the inclusion criteria. Patients were classified as varus, neutral, or valgus using a 5° cutoff for tibiotalar alignment and established criteria for foot and ankle offset. Pearson correlation was used to assess the relationship between changes in tibiotalar alignment and foot and ankle offset. Linear regression was used to quantify this association.

Results: Changes in tibiotalar alignment demonstrated a strong positive correlation (PCC = 0.832) with changes in foot and ankle offset. Each 1° correction in tibiotalar alignment corresponded to a 0.367-unit change in foot and ankle offset, with an R-squared of 0.693. Median improvement in foot and ankle offset was 2.66 in the varus group and minus 4.69 in the valgus group, indicating greater correction in valgus deformity. Postoperatively, 98% of ankles achieved neutral tibiotalar alignment. However, 80% of patients with preoperative varus foot and ankle offset remained varus, whereas valgus cases more frequently improved toward neutral.

Conclusion: Ankle replacement significantly influences global alignment, and foot and ankle offset closely reflects coronal correction.

Keywords: Weight-Bearing; Flatfoot; Computed tomography.

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Implant choice impacts initial tibial component micromotion in total ankle replacement: A biomechanical analysis

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Introduction: Despite advances in technique and implant design, total ankle replacement remains at risk of early mechanical failure. Clinical data suggest that tibial components with more robust fixation, particularly stemmed designs, have lower rates of early aseptic loosening. One proposed explanation is improved load transfer and reduced micromotion at the bone-implant interface. This study compared tibial component micromotion between stemmed and low-profile peg fixation implants using a cadaveric robotic gait simulator. We hypothesized that stemmed implants would demonstrate less micromotion during stance.

Methods: Five matched cadaveric pairs underwent computed tomography (CT) scans to create patient-specific instrumentation. Each specimen received either a low-profile peg or a stemmed tibial component in a randomized order. After implantation, gait was simulated with a validated robotic system that rotates a force plate beneath a fixed tibia. A digital image correlation system tracked surface markers to measure the relative motion between the bone and the implant. Post-simulation CT scans generated segmented geometries, and rigid-body transformations were used to calculate implant micromotion. Peak micromotion was defined as the maximum nodal displacement on the implant surface during stance. Paired t tests compared matched specimens.

Results: Mean peak micromotion was significantly greater in low-profile implants than in stemmed implants, measuring 382 versus 240 micrometers. In every matched pair, the low-profile design demonstrated higher micromotion, with an average increase of 59 percent. Peak motion in low-profile implants occurred posteriorly, consistent with sagittal rocking. In contrast, micromotion in stemmed implants was more evenly distributed and directed superiorly into bone.

Conclusion: Stemmed tibial components showed significantly less time-zero micromotion than low-profile peg designs. Excess posterior rocking in low-profile implants may contribute to early failure and subsidence.

Keywords: Arthroplasty, replacement, ankle; Ankle joint; Biomechanic; Osteoarthritis; Finite element analysis.

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Patient-specific instrumentation benefits for INBONE II total ankle arthroplasty

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Introduction: Total ankle arthroplasty reduces pain and improves mobility, but long-term success depends on accurate implant alignment and sizing. The PROPHECY patient-specific instrumentation (PSI) system was designed to enhance preoperative planning and precise placement of the INBONE II implant. This study evaluated the accuracy of PROPHECY in predicting implant size and alignment and compared outcomes with the standard jig technique. We hypothesized that PSI would improve alignment accuracy and deformity correction.

Methods: A retrospective matched study of 92 patients was conducted at a single institution, including 46 PSI and 46 non-PSI cases who were implanted with INBONE II. Groups were matched by age and sex. Demographic data, implant sizes, operative time, tourniquet time, and fluoroscopy time were collected. Pre- and postoperative radiographs were analyzed to compare implant alignment in the PSI group with the planned alignment and to evaluate postoperative tibiotalar angle and talar tilt in both groups.

Results: PROPHECY predicted implant size accurately in 68 percent of talar and 89 percent of tibial components, with most changes involving a one-size downsizing of talar components. Median absolute deviation from the planned alignment in the mortise and sagittal planes was less than 2°, demonstrating accurate execution of the preoperative plan. In both groups, the median postoperative tibiotalar angle deviation was less than 2°, and the talar tilt was 1° or less. Fluoroscopy time was similar between groups, but the PSI group had longer operative and tourniquet times.

Conclusion: For INBONE II implantation, PSI achieved alignment and sizing comparable to standard instrumentation. Longer operative time likely reflects early experience with PSI guides.

Keywords: Arthroplasty, replacement, ankle/instrumentation; Ankle joint; Arthritis; Patient reported outcome measures.

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An artificial intelligence-based GPT decision aid for single versus two-stage total ankle arthroplasty in coronal deformities

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Total ankle arthroplasty (TAA) in patients with coronal plane deformities, such as varus >10° or valgus >15°, requires precise preoperative planning to ensure successful outcomes. Complex cases often involve associated procedures (e.g., osteotomies, ligament reconstruction) and increased surgical time, which may favor a staged approach. To support clinical decision-making, we developed an AI-based tool using Generative Pre-trained Transformer (GPT) technology tailored to foot and ankle surgery. This customized GPT assists surgeons in deciding between single- and two-stage TAA based on six core factors: deformity magnitude and origin, ligament instability, need for associated procedures, patient comorbidities, local tissue condition, and estimated total operative time. The system recommends a two-stage approach when the total surgical time exceeds 150 minutes and provides a structured form to estimate the duration of each surgical step. This AI-based GPT was designed as an interactive assistant for use during surgical planning, improving consistency and promoting safer decision-making in complex deformity cases. It also suggests further actions in cases of diagnostic uncertainty, such as image analysis or direct input from the surgeon. This is, to our knowledge, the first GPT specifically trained for total ankle replacement decision support. The tool is currently undergoing validation and is accessible for clinical use

Keywords: Arthroplasty, replacement, ankle; Patient reported outcome measures; Artificial intelligence.

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Coronal alignment correction in total ankle arthroplasty using the Infinity system: A prospective observational study

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Introduction: Neutral coronal alignment is a key goal of total ankle arthroplasty (TAA). This study evaluated whether modern Infinity instrumentation restores tibial and talar alignment toward 90° and whether concomitant procedures influence coronal correction.

Methods: Multicenter prospective observational cohort including 107 consecutive ankles treated with the Infinity system (2022–2024) at two centers (Brazil and Colombia). Standardized weight-bearing radiographs were obtained preoperatively and at six months. Primary outcomes were AP tibial and talar angles relative to 90°. Secondary outcomes included lateral tibial angle and the influence of concomitant procedures.

Results: A total of 107 ankles were analyzed. Mean AP tibial angle increased from 88.1° ± 7.2° to 90.0° ± 3.5° (p = 0.016). Lateral tibial angle showed no meaningful change (89.1° ± 8.3° to 88.6° ± 3.2°; p = 0.521). Mean AP talar angle decreased from 92.6° ± 11.5° to 90.0° ± 3.9° (p = 0.050). Preoperative deviation from neutral was -1.9° (tibia) and +2.6° (talus); postoperatively, both approached 90°, although the talus remained, on average, 3.0° farther from neutral than the tibia (p = 0.002). Achilles tendon lengthening (55.1%) and lateral ligament reconstruction (19.6%) were most common; none significantly affected postoperative tibial AP alignment (all p > 0.05).

Conclusions: Infinity TAA reliably corrected coronal alignment toward 90° without a significant change in sagittal alignment.

Keywords: Ankle joint; Arthroplasty, replacement, ankle; Osteoarthritis.

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Clinical outcomes of interposition arthroplasty for surgical rigid hallux correction in a quaternary hospital in the metropolitan region of São Paulo

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Introduction: This is a retrospective case series comprising ten patients diagnosed with rigid hallux grades III and IV, followed for a mean of two years. The sample was predominantly female (90%). Patients refractory to conservative treatment for at least six months were included. Individuals with diabetes mellitus, rheumatoid arthritis, or previous surgeries in the metatarsophalangeal joint were excluded.

Methods: The surgical technique consisted of a dorsal approach, making a "U" shaped capsular flap with a distal base, partial resection of the base of the proximal phalanx and the head of the first metatarsal, followed by interposition and fixation of the capsular tissue with a non-absorbable suture. The postoperative protocol prioritized early mobilization and immediate loading with surgical footwear. Clinical outcomes were assessed using the visual analog scale (VAS) and the AOFAS.

Results: The results demonstrate that capsular interposition arthroplasty is a safe and long-lasting alternative for the treatment of advanced rigid hallux in selected patients. Compared to studies that reported high rates of metatarsalgia and cock-up deformity, the present cohort had a low rate of complications and a longer time to eventual failure.

Conclusion: The preservation of joint mobility distinguishes this technique from primary arthrodesis and is particularly relevant in physically active patients. The main limitations include the retrospective design, absence of a control group, and losses at follow-up. Still, the long follow-up period reinforces interposition arthroplasty as a viable alternative for postponing or avoiding definitive fusion.

Keywords: Hallux rigidus; Arthroplasty/methods; Foot deformities, acquired.

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End-stage ankle osteoarthritis: exploring the precedent causes and time course of joint degeneration

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Introduction: End-stage ankle osteoarthritis (OA) is primarily post-traumatic, following injuries such as fractures, dislocations, and sprains. However, the timeline between initial injury and end-stage OA requiring surgical intervention remains poorly understood. This retrospective study aimed to identify injury patterns leading to post-traumatic osteoarthritis (PTOA) and determine the time from injury to definitive surgical treatment with ankle fusion (AF) or total ankle replacement (TAR).

Methods: A retrospective cohort study was conducted using medical records of patients who underwent AF or TAR for end-stage OA at a tertiary institution over a 20-year period (2000–2020). Patients were classified into post-traumatic, primary, or secondary OA categories. In PTOA cases, initial injury radiographs were reviewed and classified. The time from injury to surgical intervention was analyzed, and a multivariate regression analysis assessed factors influencing the progression to end-stage OA.

Results: A total of 491 ankles from 479 patients were included, of which 81.3% were categorized as PTOA. The most common injury was a rotational ankle fracture (47.1%), followed by an ankle sprain (27.6%) and a pilon fracture (15.3%). The mean time from injury to AF/TAR was 16.9 years, with pilon fractures progressing the fastest (8.1 years) and tibial shaft fractures the slowest (32.7 years). Factors significantly influencing time to surgery included injury type ($p < 0.00001$), age ($p < 0.00001$), smoking status ($p = 0.016$), and peripheral neuropathy ($p = 0.04$).

Conclusion: Post-traumatic osteoarthritis is the leading cause of end-stage ankle OA, with rotational ankle fractures and ankle sprains being the most common etiologies. High-energy injuries progress more rapidly, while lower-energy injuries contribute significantly due to their high prevalence. These findings may contribute to a better understanding of the epidemiology and risk factors of end-stage ankle OA.

Keywords: Ankle Joint; Ankle fractures; joint Instability.

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Implant failure after ankle arthrodesis versus total ankle arthroplasty: a propensity score – matched multicenter retrospective cohort study

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Introduction: End-stage ankle arthritis is a debilitating condition often requiring surgical treatment when conservative measures fail. Ankle arthrodesis and total ankle arthroplasty are the two principal operative options; however, comparative data on implant failure remain inconsistent, largely due to baseline differences between patient populations and limited adjustment for metabolic and nutritional factors. This study aimed to compare the risk of implant failure between ankle arthrodesis and total ankle arthroplasty using propensity score matching and time-to-event analysis.

Methods: We conducted a multicenter retrospective cohort study using data from the TriNetX Global Collaborative Network, including adult patients (18-100 years) with ankle osteoarthritis who underwent ankle arthrodesis or total ankle arthroplasty between 2012 and 2023. Propensity score matching (1:1) was performed to balance demographic and clinical covariates. Implant failure was the primary outcome. Time-to-event analyses were performed using Kaplan–Meier methods and Cox proportional hazards models. Follow-up was anchored to the index procedure and censored at implant failure, death, loss to follow-up, or a maximum of three years, to standardize outcome assessment across cohorts.

Results: Among 7,973 eligible surgical patients, 2,745 propensity score-matched pairs were analyzed. Implant failure occurred more frequently after ankle arthrodesis than after total ankle arthroplasty (17.4% vs 12.0%; absolute risk difference, 5.4%; $p < 0.001$). Arthrodesis was associated with a significantly higher risk of implant failure, as demonstrated by relative risk, odds ratio, and Kaplan-Meier survival analysis (log-rank $p < 0.001$). In adjusted Cox regression, ankle arthrodesis remained independently associated with increased hazard of implant failure (HR 1.94; 95% CI, 1.75-2.15), and higher hemoglobin A1c was an independent risk factor, whereas serum albumin and body mass index were not.

Conclusion: Ankle arthrodesis was associated with a significantly higher risk of implant failure compared with total ankle arthroplasty. Metabolic optimization, particularly glycemic control, should be considered in surgical decision-making.

Keywords: Ankle joint; Arthrodesis; Total ankle arthroplasty; Prosthesis failure.

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Total ankle arthroplasty with TARIC prosthesis in the Unified Health System: The first 12 months of clinical and radiographic outcomes

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Introduction: The evidence of total ankle arthroplasty (TAA) in the Unified Health System (SUS) is limited. The objective was to describe early clinical and radiographic outcomes after primary TAA with TARIC (mobile-bearing) prosthesis in a public hospital.

Methods: Retrospective case series (single center, single surgeon). Preoperative evaluation and at 3, 6, and 12 months by VAS, AOFAS, MOXFQ, and ROM; weight-bearing radiographs (AP/mortise/profile) with MDTA, STA, and talar tilt (references: MDTA 85°-95°, STA 80°-90°, tilt -2° to +2°). Paired endpoint: 12 months (n = 12); analysis by Wilcoxon.

Results: At 12 months, there was a significant improvement in pain and function: VAS 8.33 ± 1.56→3.17 ± 2.66 (Δ 5.17 ± 2.62; p = 0.00049); AOFAS 40.67 ± 14.90→73.17 ± 14.89 (Δ 32.50 ± 14.96; p = 0.00049); total MOXFQ 0.80 ± 0.13→0.47 ± 0.24 (Δ 0.33 ± 0.25; p = 0.00049); ROM 20.25 ± 10.86→30.50 ± 7.54 (Δ 10.25 ± 16.52; p = 0.042). Radiographically, MDTA normalized (out: 16.7%→0%); STA improved (33.3%→16.7%) with two new cases outside the normal range; tilt talar was the most variable parameter (41.7%→50.0%). Implant-related events included indication for revision for polyethylene dislocation with replacement of the talar and poly components, talar subluxation, and severe varus tilt with polyethylene subluxation, and revision for INBONE at six months for severe arthrofibrosis and joint pain (< 12 months).

Conclusion: TAA with TARIC in SUS showed early clinical improvement and consistent correction of the tibial axis; variability in talar tilt and revision events reinforce the need for reliable technical training, as well as systematic radiographic and long-term follow-up.

Keywords: Arthroplasty, replacement, ankle; Osteoartrite; Ankle joint.

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Bacterial colonization in orthopedic surgical tourniquets: A Multicenter study

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Introduction: Reusable tourniquets are widely used in orthopedic surgeries in Brazil, but national data on their contamination are scarce. The objective of this study is to evaluate the prevalence and microbiological profile of contamination in reusable tourniquets in Brazilian hospitals.

Methods: Multicenter observational study conducted in six hospitals. Swabs were collected from 54 tourniquets immediately after surgical use and before disinfection, covering an estimated area of 10 cm^2. Samples were cultured and identified by automated methods. The bacterial load was described as the median and interquartile range (IQR), and comparisons between public and private hospitals were performed using Fisher's exact test and the Mann-Whitney test.

Results: The prevalence of contamination was 70.4% (38/54). The median global microbial load was 101 CFU per device (IQR: 0-153), corresponding to approximately 10.1 CFU/cm^2. The predominant microorganisms were coagulase-negative *Staphylococcus* (48.1%) and *Staphylococcus aureus* (18.5%), with isolation of *Pseudomonas aeruginosa*, *Bacillus* sp., and *Candida* sp. The contamination rate was 78.6% in public hospitals and 61.5% in private hospitals ($p = 0.081$), with no statistically significant difference in the median bacterial load between institutions ($p = 0.412$).

Conclusion: There is a high prevalence of contamination by clinically relevant pathogens in reusable tourniquets, regardless of the type of hospital. The results indicate systemic failures in reprocessing and suggest the need for high-level disinfection protocols or the adoption of disposable sterile devices to mitigate the risk of cross-contamination.

Keywords: Pain measurement; Cross infection; Orthopedic surgery.

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Technical note: Blue and zinc protection technique for edge management in complex wounds

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Introduction: Improper management of perilesional skin in complex wounds, such as diabetic foot ulcers and dehiscences, slows healing and increases the risk of infections. The objective of this study is to describe an innovative and low-cost blue and zinc protection technique, developed from a multidisciplinary perspective to act as a physical barrier, controlling humidity and protecting the edges.

Methods: The technique is based on the preparation of an extemporaneous formulation. It is used 5g of zinc oxide powder in association with 3 drops of an engineered aqueous solution (1% methylene blue and 1% gentian violet). The mixture is homogenized until a consistent slurry is formed. The application is strictly perilesional, without direct contact with the wound bed, followed by the appropriate secondary dressing for the exudative demand of the lesion.

Results: In the clinical application in illustrative cases of neuropathic ulcers and orthopedic surgical wounds, the paste demonstrated easy applicability and excellent adherence. The formation of an effective protective barrier against maceration of the edges by the exudate was observed. The known properties of the dyes suggest adjuvant antimicrobial and antifungal action, protecting the epidermis in the cell migration phase.

Conclusions: The blue and zinc protection technique is presented as a safe, accessible, and easy-to-perform strategy for protecting edges in foot and ankle injuries. The standardization of this preparation optimizes the perilesional microenvironment, favoring the reconstructive clinical outcome.

Keywords: Diabetic foot; Wound healing; Zinc oxide.

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Transmetatarsal and radius amputations in the diabetic foot: do they really improve survival and reduce progression to larger amputations? A 10-year follow-up analysis

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Introduction: The prevalence of diabetes mellitus (DM) has been increasing, reaching about 14% of adults in 2022. Among its complications, amputations stand out. Smaller amputations better preserve function, reduce energy expenditure and are associated with better quality of life and survival outcomes, although they have a higher rate of reinterventions. There are still gaps in survival, recurrence of diabetic foot ulcers (DFU) and progression to larger amputations. The objective was to evaluate survival after minor amputations and to analyze factors associated with recurrence, reamputations, and mortality.

Methods: Retrospective cohort (2013–2022) with 100 diabetic patients undergoing lightning or transmetatarsal amputations in a private tertiary hospital with more than one year of follow-up. Clinical data were collected with double checking. The primary outcome was survival (time between first amputation and death/last follow-up). Variables: age, sex, affected limb, recurrence, and number of ulcers, comorbidities (insulin-dependent DM, SAH, CKD, and PAD).

Results: Mean age 67.5 years; 75% men; mean follow-up 55.4 months. High burden of comorbidities (CKD 83%, SAH 50%). There were 21 deaths (20.4%), with a mortality of 8% in the first year; mean survival of 47.9 months and approximately 75% in 100 months. Among survivors, 53.2% had recurrence of DFU (often multiple). Reamputations occurred in 26%, with proximal progression; 6.67% of transmetatarsals evolved to transtibial amputation. In the univariate analysis, insulin-dependent DM (OR 3.08; p = 0.007) and PAD (OR 3.05; p = 0.014) were associated with recurrence; pad was also associated with mortality (OR 3.93; p = 0.005).

Conclusion: Smaller amputations showed good survival and low progression to higher levels, constituting an effective strategy for limb preservation. However, the high recurrence of ulcers and reamputations reinforces the need for continuous follow-up and a multidisciplinary approach.

Keywords: Amputations; Diabetes complications; Diabetic Foot.

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Surgical and conservative treatment of posterior chain lengthening in the management of plantar ulcers: a narrative review

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Introduction: Plantar ulcers represent a significant complication in patients with diabetes mellitus and peripheral neuropathy, negatively impacting their quality of life and increasing the risks of serious infections. This study aims to evaluate the efficacy and safety of surgical and conservative posterior chain lengthening interventions in individuals with plantar ulcers.

Methods: A narrative review of the literature was conducted in the PubMed, SciELO, and LILACS databases.

Results: A total of 361 studies were found, and after selection and detailed analysis against the eligibility criteria, eight studies were included. It was found that the total sample comprised approximately 433 individuals, predominantly males, aged 49.2 to 70.5 years. Patients included were diagnosed with diabetes mellitus and/or peripheral neuropathy. Interventions included conservative treatment through exercises and techniques for stretching the calf muscles or the posterior chain, and surgical treatment, a percutaneous stretching procedure of the calcaneal tendon.

Conclusion: Most studies show the benefits of stretching the calf muscles in the prevention and management of plantar ulcers, with improved mobility, dorsiflexion, and reduction of plantar pressure. However, complications such as ulcer recurrence, pain, and healing failures were more frequent in surgical approaches. The findings reinforce the importance of individualized strategies for managing these injuries, considering the patient's clinical profile and the potential risks and benefits of each intervention.

Keywords: Foot ulcer; Diabetes Mellitus; Muscle stretching exercise.

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Plantar osteomyelitis due to Candida parapsilosis secondary to late migration of industrial silicone in the gluteus area in a transgender woman: a case report

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Clandestine injections of industrial liquid silicone for aesthetic purposes, especially in transgender women, can cause late complications, including distal migration of the silicone, foreign body granuloma, and opportunistic infection, even years after the procedure. Diabetic patients with a history of repeated infiltrations are particularly susceptible. A 56-year-old transgender woman, diabetic, presented with chronic plantar pain initially treated as plantar fasciitis, with eight corticosteroid infiltrations, without improvement. It evolved with edema and hyperemia in the hallux, suggestive of gouty arthritis. Preoperative magnetic resonance imaging suggested calcaneal osteomyelitis and plantar collections. During surgery, in the calcaneal region, clear liquid similar to that previously drained from the forefoot was found. A bone fragment collected from the calcaneus was positive for Candida parapsilosis, sensitive to caspofungin, amphotericin B, and voriconazole, and resistant to fluconazole. Distal plantar collection showed migrated silicone and a foreign body reaction. The case shows late migration of industrial silicone from the gluteal region to the foot, with a granulomatous reaction and opportunistic osteomyelitis due to Candida parapsilosis, probably facilitated by repeated corticosteroid infiltrations in diabetic patients. This scenario is rarely described in the literature, especially in cases involving bone. In transgender women with a history of industrial silicone and chronic plantar pain, subcutaneous collections and signs of osteomyelitis may represent opportunistic fungal co-infection. Accurate diagnosis, collection of material for specific cultures, and multidisciplinary management (orthopedics, infectious diseases, surgery/plastic surgery) are essential for functional preservation and clinical cure.

Keywords: Osteomyelitis; Transgender persons; Silicones.

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Treatment of corticosteroid-induced tibial osteonecrosis – decompression and tibial intramedullary nail: a case report

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Clandestine injections of industrial liquid silicone for aesthetic purposes, especially in transgender women, can cause late complications, including distal migration of the silicone, foreign body granuloma, and opportunistic infection, even years after the procedure. Diabetic patients with a history of repeated infiltrations are particularly susceptible. A 56-year-old transgender woman, diabetic, presented with chronic plantar pain initially treated as plantar fasciitis, with eight corticosteroid infiltrations, without improvement. It evolved with edema and hyperemia in the hallux, suggestive of gouty arthritis. Preoperative magnetic resonance imaging suggested calcaneal osteomyelitis and plantar collections. During surgery, in the calcaneal region, clear liquid similar to that previously drained from the forefoot was found. A bone fragment collected from the calcaneus was positive for Candida parapsilosis, sensitive to caspofungin, amphotericin B, and voriconazole, and resistant to fluconazole. Distal plantar collection showed migrated silicone and a foreign body reaction. The case shows late migration of industrial silicone from the gluteal region to the foot, with a granulomatous reaction and opportunistic osteomyelitis due to Candida parapsilosis, probably facilitated by repeated corticosteroid infiltrations in diabetic patients. This scenario is rarely described in the literature, especially in cases involving bone. In transgender women with a history of industrial silicone and chronic plantar pain, subcutaneous collections and signs of osteomyelitis may represent opportunistic fungal co-infection. Accurate diagnosis, collection of material for specific cultures, and multidisciplinary management (orthopedics, infectious diseases, surgery/plastic surgery) are essential for functional preservation and clinical cure.

Keywords: Osteonecrosis; Injections, intra-articular; Corticosteroid; Intramedullary nail.

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3D assessment of residual deformity in adult clubfoot patients treated with the Ponseti technique and its relationship with patient-reported outcomes

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Introduction: The gold-standard treatment for clubfoot deformity (CFD) is the Ponseti technique, but few studies have assessed its long-term outcomes. This study aims to elucidate residual three-dimensional (3D) weight-bearing computed tomography of foot deformities in CFD patients treated with the Ponseti technique, and to compare them with healthy patients. We also assessed how these deformities may influence patient-reported outcomes (PROs).

Methods: In this prospective, comparative, and controlled study, 37 CFD patients (57 feet) treated with the Ponseti technique with no additional surgical procedures were recruited. Fourteen healthy volunteers (28 feet) were also included. All patients underwent WBCT, the tarsal bones were semi-automatically segmented, and several automatic measurements assessing cavus, varus, adductus, and overall 3D deformity were performed (FAO). PROs were collected, and multivariate regression analysis was used to assess the relationship between residual deformities and outcomes.

Results: There was no significant overall residual 3D deformity observed in CFD patients when compared to controls (mean FAO: CFD 2.4% vs. controls 4.0%; $p = 0.49$). CFD patients had increased varus (TCA: $p < 0.0001$; HMA: $p = 0.02$) and adduction (TNCA: $p < 0.0001$), while presenting with decreased cavus (sagittal TFMA: $p = 0.03$; CIA: $p < 0.001$) compared with controls. Sagittal TFMA was correlated with VAS ($R^2 = 0.19$, $p = 0.012$; 2.93 + [0.09*TFMA]) and EFAS ($R^2 = 0.27$, $p = 0.0025$; 15.26 + [-0.26*TFMA]), while TCA correlated with PROMIS-PI ($R^2 = 0.14$, $p = 0.038$; 62.5 + [-0.29*TCA]) and PROMIS-PF ($R^2 = 0.32$, $p = 0.0007$; 31.3 + [0.44*TCA]).

Conclusion: This study highlights the efficacy of the Ponseti technique in treating the overall 3D foot and ankle deformity in CFD patients, realigning the ankle joint and the weight-bearing foot tripod. However, residual CFD components were identified, including overcorrection of the cavus and undercorrection of the adductus and varus deformities, which negatively influenced PROs.

Keywords: Orthopedic procedures; Clubfoot; Tomography, X-Ray Computed.

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Results of the Ponseti method after congenital clubfoot recurrence subjected to posteromedial release: A retrospective study of 57 feet

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Introduction: The treatment of congenital clubfoot (CCF) relied on corrective surgeries, such as posteromedial release, as the method of choice, especially in cases of recurrence. However, such surgeries were associated with stiffness, pain, and recurrence. This study aims to evaluate the efficacy of the Ponseti Method in patients with recurrence after posteromedial release.

Methods: Descriptive retrospective study of 40 children (57 feet) with recurrence of CCF previously submitted to posteromedial release, treated with the Ponseti Method between 2001 and 2024. The protocol included serial manipulations with weekly casts until the deformities were corrected. In patients > 4 years of age, in addition to serial casts, tenotomy and transposition of the anterior tibial tendon were performed. The final evaluation was performed using the Pirani score and the functional classification of Nogueira et al. (2017), which classifies the results as "excellent", "good", "regular", and "poor".

Results: The mean age at the first visit was five years and five months (range: 9 months to 16 years). Most cases were idiopathic (92.5%), with a predominance of males. The mean cast was 6 (2-20). Twenty patients (50%) underwent a new tenotomy of the Achilles, and 12 patients (30%) older than four years also underwent transposition of the anterior tibialis. The recurrence rate was 15% (6 patients), with two cases requiring major reinterventions (tarsectomy and first-ray elevation). Three cases evolved with deformities due to hypercorrection (one calcaneus-cava and two plane-valgus). The initial Pirani was 3.9, and the end was 0.5. According to the functional classification, 42.1% of the feet were considered "excellent", 47.4% "good", 8.77% "regular", and 1.75% "poor", totaling more than 89.5% of plantigrade feet.

Conclusion: The Ponseti method has been shown to be a treatment choice for CCF previously submitted to posteromedial release. With a high functional success rate and potential to avoid further extensive surgeries.

Keywords: Orthopedic procedures; Conservative treatment; Congenital clubfoot.

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Treatment of myelodysplastic feet by the Ponseti method: A 20-year cohort study

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Introduction: Congenital clubfoot (CCF) is present in about 30%-50% of patients with meningomyelocele (MMC), and its treatment aims to minimize the impact on mobility and quality of life of these children. Treatment options include multiple surgical procedures. The hypothesis is that the Ponseti method in patients with MMC and CCF yields results similar to those in patients with idiopathic CCF.

Methods: This is a retrospective observational cohort study from 2004 to 2024 comparing patients with CCF and MMC who underwent treatment with the Ponseti method with patients with idiopathic CCF who underwent correction with this method.

Results: We evaluated two groups: the first with 50 patients (83 feet) with CCF and MMC; and the second with 170 patients (293 feet) with idiopathic CCF. There was no statistically significant difference between the two groups in initial Pirani score (p-value: 0.471), final Pirani score (p-value: 0.968), number of casts performed (p-value: 0.976), and number of patients with recurrences (p-value: 0.644). Initial correction was achieved in 98% of MMC patients, and this correction remained in 86%. Age at treatment initiation, follow-up time (3.1 years for patients with MMC, and 4.9 years for idiopathic patients and the number of complications (44% compared to 8% in idiopathic patients) were the variables that presented a statistical difference (p-value < 0.05). Regarding subgroup analysis of high and low lumbar MMC, initial Pirani score, and bilaterality, these variables showed statistical differences.

Conclusion: The Ponseti method in the treatment of MMC and CCF is effective, providing initial correction of 98% and final correction (at the end of the 3.1-year follow-up) of 82%, with recurrences in 44% of cases, but with no difference compared with idiopathic patients. However, MMC patients had a 44% complication rate, compared to 8% in idiopathic patients, with a 4.9-year follow-up.

Keywords: Congenital clubfoot; Conservative treatment; Meningomyelocele.

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Progressive digital gigantism due to macrodystrophia lipomatosa: Surgical management and functional restoration in a pediatric patient

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Macrodystrophia lipomatosa is a rare, non-hereditary congenital malformation characterized by disproportionate tissue growth, with fibro-fat proliferation. The volumetric increase compromises bone, nerve, vascular, and soft tissue structures, with static or progressive evolution. The diagnosis is clinical-radiological and requires exclusion of syndromic conditions. When it affects the toes, there is difficulty with footwear, gait changes, and psychosocial repercussions. Surgical treatment is challenging because it requires a balance between adequate resection of excess tissue and the preservation of structure. The objective of this study is to report the surgical management and clinical outcome in pediatric patients with progressive digital gigantism. The case report is based on a review of the patient's electronic medical record, obtained with free and informed consent, and the patient is followed at a tertiary service. A 7-year-old male patient with congenital, non-syndromic, and progressive macrodystrophia lipomatosa in the 2nd and 3rd toes (PDD). The patient reported poor shoe fit and aesthetic dissatisfaction. Preoperative assessment included analysis of forefoot alignment, digital proportion, and neurovascular integrity. In reconstructive surgery, a V incision was made over the 3rd ray, followed by amputation of the ray with a preserved base. Reductional syndactyly was performed to adjust the interdigital space and improve the forefoot contour. Amputation of the middle and distal phalanges of the 2nd toe was also performed to harmonize the digital length. At three months of follow-up, the patient walked normally, with adequate adaptation to footwear and satisfaction with the aesthetic result. Individualized surgical management of digital gigantism can restore function and significantly improve aesthetics. The strategic preservation of anatomical structures and careful preoperative planning are fundamental for better results.

Keywords: Gigantism; Lipomatosis; Foot deformities, congenital.

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Capsulotendinous rebalancing surgery in pediatric congenital varus hallux: a case report

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The varus hallux is characterized by medial deviation of the first toe, resulting from an imbalance between the capsuloligamentous and tendinous structures responsible for the first ray stability. The most common form is iatrogenic, usually after correction of hallux valgus; congenital presentation is rare and can occur in isolation or syndromically. Clinically, it is manifested by difficulty in wearing shoes and significant aesthetic repercussions. Surgical treatment is indicated in the face of significant deformity with functional impairment. The objective is to report capsulotendinous rebalancing surgery in a pediatric patient with non-syndromic congenital varus hallux. Case report based on review of medical records, photographic records, and outpatient follow-up in a tertiary service. The adult responsible in charge signed an Informed Consent Form. A 6-year-old male patient, with congenital varus hallux in the right foot, presents with marked medial deviation and difficulty wearing shoes. Medial longitudinal access of the hallux was performed, with medial capsulotomy, tenotomy of the abductor, and stretching of the flexors. In the first interdigital space, a V incision was made to resect the lateral capsule and the skin surplus. Immobilization with an adhesive was instituted for four weeks. In the early and late postoperative periods (2-year follow-up), the patient maintained adequate hallux alignment, wore regular shoes, and had no complications. Capsulotendinous rebalancing proved to be a safe and effective strategy for the treatment of congenital varus hallux, providing correction of misalignment, functional improvement, and adequate adaptation to footwear use. The biomechanical balance of the first ray was restored, with favorable short- and long-term evolution.

Keywords: Hallux varus; Forefoot, human; Defect, congenital.

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Gait biomechanics in patients with leprosy and drop foot: preoperative and postsurgical correction analysis with tendon transposition using the posterior tibialis

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Introduction: The neurological lesion involving the common peroneal nerve caused by leprosy can lead to drop foot. Surgical correction with tendon transposition can reestablish dorsiflexion and improve gait in these patients; no study using three-dimensional analysis has reported the spatiotemporal, kinematic, and dynamic parameters preoperatively and/or postoperatively. The objective is to describe the biomechanical changes in gait in patients with leprosy and unilateral drooping foot, and to demonstrate the changes after transposition of the posterior tibialis.

Methods: Twelve patients with leprosy and drop foot were evaluated in the gait laboratory. A control group of 15 healthy subjects, matched for weight and height, was used.

Results: The affected limb showed increased plantar flexion in the initial contact (-16.8° ± 8.3), terminal support (-29.1°± 11.5), and balance (-12.4° ± 6.2) compared to the unaffected limb (-6.6° ± 10.3; -14.6° ± 11.6; 2.4° ± 7.6) and to the control group (-5.4° ± 2.5; -18.8° ± 5.8; -1.4° ± 3.9) ($p < 0.05$). The second peak ground reaction force (98.6 ± 5.2% body weight), ankle moment (0.99 ± 0.33 Nm/kg) and total ankle work during stance (-0.03 ± 5.4 J/kg) were reduced in the affected limb compared to the control group (104.1 ± 5.5% body weight; 1.24 ± 0.4 Nm/kg; -4.58 ± 5.19J/kg; $p < 0.05$). An increase in gait speed was observed after surgical correction compared to the preoperative period (0.86 ± 0.2; 0.96 ± 0.2; $p < 0.001$). The affected limb demonstrated improvement in ankle position at initial contact (-12.8 ± 3.0; -1.5 ± 3.5), reduction in plantar flexion peak during support (-25.1 ± 7.3; -12.7 ± 5.2), and increase in mean dorsiflexion in the swing (-16.4 ± 2.0; -8.7 ± 5.1; $p < 0.001$).

Conclusion: Patients with leprosy and drop foot presented gait changes in the affected limb. After surgical correction, improvements were observed in spatiotemporal parameters and ankle kinematics.

Keywords: Leprosy; Dropped foot; Tendon transfer.

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The positive side of high-heeled shoes

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Introduction: Wearing high heels is a common practice, especially among women, and is part of the social and professional environment in urban life. Research on the subject often focuses on the symptoms and health effects of high heels, including discomfort, pain, musculoskeletal disorders, and deformities, particularly in the feet. As few studies have evaluated the subjective effects of high heels, we investigated why some people are adept at wearing them, while others are not.

Methods: A cross-sectional, quantitative study was conducted using a self-administered online questionnaire that covered participants' profiles and reasons for wearing high-heeled shoes or not. The convenience sample consisted of women aged ≥18 years. Data were collected between November 2023 and March 2024.

Results: A total of 1100 responses were obtained, with a final sample of 801 participants. The variables significantly associated with the use of high heels were age, education, profession, approximate family income, and nutritional status. 80% of participants reported wearing high heels for aesthetics, 63% felt more beautiful, 21% to get taller, 54% to improve professional appearance, and 47% reported improved self-esteem with the use of this garment.

Conclusion: Most participants wear high heels for aesthetic reasons, with a significant percentage feeling more beautiful and with improved self-esteem. Although the majority of participants who wear high heels experience pain (66%), they report sufficient subjective reasons to continue wearing them. Among those who reported not wearing high heels, the main reason was foot pain or discomfort.

Keywords: Footwear; Self Concept; Pain.

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Transcutaneous radiofrequency in the treatment of plantar fasciitis-related pain: a case series

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Introduction: Plantar fasciitis (PF) is a multifactorial painful syndrome. Treatment is generally conservative, but 20% to 30% of cases become refractory, requiring the combination of therapies for pain relief. Transcutaneous radiofrequency (TRF) is an electrical stimulation modality with a potential analgesic effect. The objective is to evaluate the analgesic effect of TRF in patients with PF and refractory pain.

Methods: Twenty patients were invited to the outpatient clinic of the Orthopedics Foot Group of the Hospital do Servidor Público Estadual de São Paulo, diagnosed with refractory plantar fasciitis. After the informed consent form, the scale of pain intensity (NRS) and quality of life were applied through the SF-12 questionnaire. The treatment consisted of two sessions of TRF with an interval of 15 days between sessions. After three weeks, patients were re-evaluated with the same scales.

Results: The sample consisted of 20 patients, 17 females, and 03 males. The mean age was 64.04 ± 10.679. Of these, 40% had a single diagnosis of PF, and 60% had another painful foot condition. There was a follow-up loss of 15% (n = 3). The distribution of the pain intensity scale (NRS) in the first step of the day was compared. Mean pain was lower after the procedure, 7.40 ± 1.788 versus 3.59 ± 2.501, p = 0.0004, Wilcoxon. For daytime pain intensity, the mean was also lower, 7.40 ± 1.788 versus 1.79 ± 2.332, p = 0.001, Wilcoxon. The inclusion of non-exclusive complaints from PF, the limited sample size, the lack of a control group, and possible researcher empathy may have affected the results.

Conclusion: Transcutaneous radiofrequency showed a significant analgesic effect in the pre- and post-procedure comparison in patients with plantar fasciitis. The findings encourage the development of a more robust, prospective, controlled, blinded study in a larger sample and with more rigorous diagnostic criteria.

Keywords: Fasciitis, plantar; Radiofrequency therapy; Administration, cutaneous.

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Evaluation of the sagittal range of motion of the leg-foot after talocalcaneal arthrodesis

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Introduction: Subtalar arthrosis is a disabling condition that can significantly impair hindfoot mechanics and overall foot function. Talocalcaneal arthrodesis is a well-established surgical procedure for pain relief and stabilization; however, its impact on the sagittal range of motion of the leg-foot complex and on midfoot mobility remains unclear. Understanding these biomechanical changes is essential to better predict functional outcomes and guide clinical decision-making. The objective is to evaluate the influence of talocalcaneal arthrodesis on the sagittal range of motion of the leg-foot and mobility of the midfoot.

Methods: We evaluated leg-foot mobility in 12 patients who underwent talocalcaneal joint arthrodesis, pre- and post-surgery. Leg-foot mobility was measured by means of radiographic examination in profile view. Maximum dorsiflexion was achieved by asking the patient to step forward with the contralateral foot and perform as much dorsiflexion of the affected ankle as possible without lifting the heel off the ground. For maximum plantar flexion, the patient was asked to step back with the contralateral foot and achieve as much plantar flexion as possible without lifting the affected forefoot off the ground. We performed this radiographic sequence before surgery, after arthrodesis consolidation, and in the contralateral lower limb. We used the angle between the tibia and the ground to measure leg-foot movement and Meary's angle, traced on the long axis of the talus and first metatarsal bone, to evaluate the sagittal movement of the midfoot.

Results: Twelve patients with subtalar arthrosis were evaluated, seven males and five females, with a mean age at the time of surgery of 44.5 years. The mean follow-up time after arthrodesis was 38.8 months. All the arthrodeses consolidated. Considering the leg-foot sagittal movement, the mean preoperative value was 43.7°, postoperatively, 45°, and on the contralateral side, 57°. In the midfoot evaluation, the range of motion in the preoperative period was 3.6°, in the postoperative period, 7.1°, and on the contralateral side, 11.2°. Although, on average, midfoot mobility was lower than on the contralateral side used as a control, when we examined cases individually, we found that in five patients the mobility of the contralateral side was lower than that of the control side, and in seven it was higher. Due to this data, we cannot conclude the effect of subtalar arthrodesis on the midfoot movement.

Conclusion: Based on the radiographic evaluation performed in this study, both arthrosis and talocalcaneal arthrodesis reduce leg-foot range of motion. We cannot conclude as to the effect of this arthrodesis on midfoot mobility.

Keywords: Range of Motion, Articular; Ankle; Foot.

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Three-dimensional kinematic analysis of running in rocker-soled shoes

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Introduction: Rocker-soled shoes (rocker-bottom/profile) are widely used to redistribute forefoot loads and reduce local overload in conditions such as diabetic foot, rigid hallux, and metatarsalgia. By creating a fulcrum proximal to the metatarsal heads, the rocker shifts the shoe's rotation point and can alter lower-limb kinematics; however, evidence from running in healthy individuals remains limited and controversial. The objective is to compare three-dimensional (3D) kinematic parameters during a race between a conventional shoe and a rocker-soled shoe, testing the hypothesis that the rocker reduces ankle eversion and knee flexion peaks.

Methods: Cross-sectional study approved by the Ethics Committee, with 20 healthy volunteers (12 men; 18–35 years), without previous lesions and with alignment of the hindfoot between 0° and 10°. The following were compared: (1) conventional shoes (flat and flexible sole; 13 mm; drop 6 mm; Ever Way® Marvin) and (2) rocker shoes (rigid sole; 30 mm; apex at 60% of the length; radius 15.5 cm; Hoka® Gaviota 5). 3D kinematics were collected using a Vicon system with 8 cameras (250 Hz during running), Butterworth filtering, angular calculation using Grood and Suntay, anatomical calibration (CAST), and phase identification using the Foot Velocity Algorithm. The run was performed on a treadmill, at the participant's preferred speed, after warm-up and adaptation. Statistics: paired t-test or Wilcoxon test ($p < 0.05$), with a priori sample calculation ($n = 20$).

Results: Age 27.9 ± 4.8 years; BMI 23.7 ± 2.1 kg/m^2. Conventional shoes showed a higher peak and a longer ankle eversion time during support, along with a lower eversion speed; there was no difference in cadence or angular parameters of the knee and hip.

Conclusion: The rocker sole modifies the kinematics of running and reduces ankle eversion during support, without changing the cadence or kinematics of the knee and hip.

Keywords: Footwear; Kinematics; Biomechanical Phenomena.

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Effect of a global rehabilitation program on static postural control, dynamic stability, and functionality in individuals with lateral ankle instability. A randomized clinical trial

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Introduction: Conventional rehabilitation for lateral ankle instability (LAI) emphasizes segmented ankle strengthening. Because LAI involves the entire kinetic chain, global exercises may be an alternative. This study compared global and conventional exercises for postural control, dynamic balance, and functionality, and evaluated dorsiflexion range of motion (ROM), passive ankle stiffness, recurrence, and 6-month retention.

Methods: Forty-seven individuals with LAI were randomized to global exercises (multi-joint, bodyweight) or conventional exercises (segmented ankle exercises with equipment). Both groups received home-exercise booklets for eight weeks. Outcomes at baseline, four and eight weeks, and six months included center-of-pressure (COP) variables on a force platform, Modified Star Excursion Balance Test, Foot and Ankle Ability Measure, dorsiflexion ROM, and passive ankle stiffness.

Results: Both groups improved dynamic stability ($p = 0.001$), COP mean velocity ($p = 0.001$), COP SD ($p = 0.002$), COP area ($p = 0.001$), functionality ($p = 0.001$), and dorsiflexion ROM ($p = 0.001$). Effects were maintained for six months, except for COP SD. Passive ankle stiffness did not improve. No superiority of global exercises was found. Sprain recurrence was lower in the global group (88.2% without new sprains) than in the conventional group (52.6%).

Conclusions: Global exercises were not superior to conventional exercises, but they were effective, accessible, and associated with lower recurrence, supporting their use as an alternative rehabilitation strategy for LAI.

Keywords: Ankle injuries; Exercise therapy; Postural balance.

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Effect of rocker-soled shoes on the position of metatarsophalangeal joints: Imaging study with weight-bearing computed tomography

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Introduction: Rocker-soled shoes ("rocker-bottom/profile") redistribute forefoot loads and reduce local overload, and are used for diabetic foot, rigid hallux, and metatarsalgia. The proposed mechanism is the rocker fulcrum, which facilitates progression in detachment by reducing metatarsophalangeal (MTP) dorsiflexion and pressure under the metatarsal heads. Despite evidence of lower plantar pressure, anatomical data on the sagittal MTP range of motion under weight-bearing are lacking. Weight-bearing computed tomography (WBCT) allows three-dimensional MTP evaluation without overlap. The objective is to compare MTP angles of the second and third rays in detachment in barefoot individuals, with conventional shoes, and rocker shoes.

Methods: Prospective comparative study with 20 volunteers (18–65 years), without complaints/deformities, hindfoot 0°–10°. Rigid deformities, previous surgeries/fractures, rheumatic diseases, secondary causes of metatarsalgia, neuromuscular syndromes, varus/valgus, and tomographic signs of coalition/osteoarthritis were excluded. Minimum sample n = 17 (power 90%); 20 were included. Cone beam WBCT was performed. Each foot was evaluated in three conditions: barefoot (GD), conventional shoes (GCC), and rocker shoes (GMB; apex at 60% of the outsole; radius 15.5 cm; rigid outsole). Detachment was simulated with 15° plantar flexion with load, maintaining the position with supports. Metatarsal joint coverage angle (JCA) and MTP extension angle (EAM) were measured in the second and third rays in plantigrade and detachment; the difference (detachment-plantigrade) was analyzed. Statistics: ANOVA of repeated measures and Friedman, with paired comparisons and Bonferroni.

Results: Twenty subjects (10M/10W), 40 ft. The variation in JCA and EAM between plantigrade and detachment was lower in the rocker shoes (GMB) vs GD and GCC, with no difference between GD and GCC.

Conclusion: Rocker-soled shoes require less mobility of the second and third MTP joints between plantigrade support and detachment in individuals without pathology.

Keywords: Footwear; Kinematics; Magnetic Resonance Imaging.

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Use of adipose-derived mesenchymal stem cells in wound healing: a case report

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Complex lower-limb wounds with exposure of nerves and vessels pose challenges in orthopedics. Regenerative medicine via fat aspirate appears to be an option. Adipose tissue is rich in mesenchymal stem cells and pericytes, which modulate inflammation and angiogenesis, accelerating repair in difficult-to-heal beds. Male patient, 33 years old, with an open fracture GA IIIb in the ankle after a motorcycle accident. It evolved with necrosis, dehiscence, and exposure of the synthesis material after ORIF. It had a fibrotic bed and no border progression. Under anesthesia, infraumbilical liposuction was performed, with mechanical processing in a closed system to obtain Microfragmented Adipose Tissue (MFAT). The product was injected retrograde along the wound edges and into the wound bed. In the first week post-MFAT, exuberant granulation was observed. In the third week, Figueiredo dressing was used to protect the tissue. After eight weeks of MFAT application and five weeks of Figueiredo dressing, the patient underwent successful autologous skin grafting. The technique allowed the reconstruction of the microvasculature, enabling coverage by a simple graft at the expense of complex surgical flaps. MFAT preserves the microvascular unit, allowing pericytes to become active stem cells at the site of injury. The technique stands out for its low morbidity in the donor area and its ability to convert stagnant wounds into pro-regenerative environments. This allows restoration of the microvasculature and acceleration of epithelialization, making conventional skin grafts viable in previously devitalized tissues. The use of MFAT has been shown to be a safe and effective adjunctive therapy for complex orthopedic wounds. The technique optimizes hospital stay length and enables less invasive coverage procedures in settings where they would initially be contraindicated.

Keywords: Wound Healing; Adipose Tissue; Regeneration.

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Low serum vitamin D levels are not associated with pseudoarthrosis and implant loosening in ankle arthrodesis: a retrospective cohort

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Introduction: Hypovitaminosis D is a global problem associated with bone disorders such as osteopenia and osteomalacia. Its influence on bone healing can affect orthopedic procedures, including ankle arthrodesis, used to treat advanced osteoarthrosis. The objective is to analyze the relationship between hypovitaminosis D and outcomes of pseudoarthrosis and implant loosening after ankle arthrodesis.

Method: Retrospective and observational study using data extracted from the TriNetX international platform, including patients of both sexes, aged ≥18 years, undergoing tibiotarsal or tibiotalocalcaneal arthrodesis between 2016 and 2020, with at least one dosage of 25-hydroxyvitamin D in the perioperative period and one year of follow-up. Patients were divided into two groups: vitamin D deficiency (≤20 ng/ml) and no deficiency (>20 ng/ml). Statistical analyses used logistic regression with propensity score matching, as well as chi-square, Student's t, and Log-rank tests.

Results: In total, 306 patients were selected for the study. After pairing, 72 patients were analyzed in each group. There was no statistically significant difference between the groups (adjusted OR = 0.878; 95% CI: 0.333–2.309; p = 0.7912). Similarly, there was no association between vitamin D deficiency and implant synthesis failure/loosening (adjusted OR = 1.017; 95% CI: 0.394–2.623; p = 0.9723).

Conclusion: The results indicate that vitamin D deficiency is not significantly associated with the risk of pseudoarthrosis or implant loosening in the short term. While supplementation may be beneficial, its clinical impact remains to be further investigated.

Keywords: Pseudarthrosis; Vitamin D.

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Three-dimensional kinematic analysis of running in rocker-soled shoes

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Introduction: Rocker-soled shoes have mechanical advantages by redistributing load to the forefoot and reducing local overload, and are widely used for foot and ankle pathologies and in sports models. By creating a plantar volume proximal to the metatarsal heads, the rocker establishes a fulcrum during support and can modify biomechanics. Compared with conventional shoes, the rocker shifts the point of rotation, redistributes pressure, and can alter the kinematic demands on the hip, knee, and ankle. Although some studies show changes in gait parameters with rocker shoes, the findings are heterogeneous, and there remains a lack of evidence from standardized three-dimensional (3D) analysis protocols in healthy individuals. The objective of this study was to compare 3D kinematic gait parameters in healthy individuals walking in conventional versus rocker shoes, with the hypothesis that rocker shoes would reduce peak knee flexion and ankle eversion/inversion amplitudes.

Methods: Cross-sectional study with 20 healthy volunteers (12 men), with clinical alignment of the hindfoot between 0° and 10°. Patients with rigid deformities, prior foot surgery/fractures, rheumatic diseases, and other secondary causes of metatarsalgia were excluded. The following were compared: conventional shoes (flat, flexible sole; 13 mm; 6 mm drop; Ever Way® Marvin) and rocker shoes (rigid sole; 30 mm; apex at 60% of the length; radius 15.5 cm; Hoka® Gaviota 5). The 3D kinematics were collected by a Vicon system with eight cameras. The walk was performed on a treadmill for three minutes at 5.5 km/h.

Results: Age 27.9 ± 4.8 years. Conventional shoes showed higher peak knee flexion during support, higher peak and longer ankle eversion times, and lower peak ankle inversion ($p < 0.05$).

Conclusion: The rocker sole modifies gait kinematics in healthy individuals, reducing peak knee flexion and peak ankle eversion time, and increasing peak inversion time, compared to conventional shoes.

Keywords: Footwear; Kinematics; Biomechanical phenomena.

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Arthroscopic treatment of osteochondral lesions of the talus using platelet-rich fibrin biological scaffold

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Introduction: Osteochondral lesions of the talus (OLT) are a frequent cause of chronic ankle pain and functional limitation. Single-stage biological strategies, such as autologous platelet-rich fibrin (PRF), have been proposed as scaffolds to enhance repair.

Methods: This retrospective case series evaluated patients with symptomatic OLT treated arthroscopically with lesion preparation and application of an intraoperatively prepared autologous PRF scaffold (A-PRF membrane and i-PRF), with a minimum follow-up of 18 months. Outcomes included AOFAS, FAOS, and VAS scores, return to sports, and complications.

Results: Thirty-six patients (14 women, 22 men; mean age 39 years) were included. AOFAS improved from 54.1 to 82.6 ($p < 0.001$), and VAS pain decreased from 7.58 to 2.69 ($p < 0.001$) at final follow-up. FAOS domains improved substantially, including quality of life (25.2 to 63.9). More than 80% of patients returned to sports at a mean of 7.6 months. The complication rate was 11.1%, including transient paresthesia, superficial wound infection, and one reoperation.

Conclusion: Arthroscopic treatment of OLT augmented with an autologous PRF scaffold was associated with improved pain and function at mid-term follow-up with an acceptable complication rate. Comparative studies are needed to determine the incremental benefit of PRF over marrow stimulation alone.

Keywords: Biological products; Scaphoid bone; Talus; Arthroscopy.

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Medial malleolar osteotomy – the influence of two types of osteotomies and two fixation methods on articular displacement in freshfrozen cadaveric specimens

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Introduction: The medial malleolar osteotomy is required in some cases of osteochondral lesions, bone tumors, and fractures of the medial talar dome for surgical access. The literature is uncertain about which type of osteotomy and fixation is best. The objective of this study was to compare, in cadaveric specimens, the oblique and chevron medial malleolar osteotomies and their fixation with two or three screws, and to evaluate the potential for articular displacement. We hypothesize that the chevron osteotomy results in a lower chance of articular displacement at the end of the procedure than the oblique osteotomy. Our second hypothesis is that fixation with three screws also reduces the risk of articular displacement compared with two screws.

Methods: Forty anatomical freshfrozen specimens were analyzed and divided into four groups (10 per group): oblique osteotomy fixed with two or three screws, and chevron osteotomy fixed with two or three screws. One fracture occurred in the chevron osteotomy group with three screws, leaving thirty-nine specimens for analysis. After osteotomies and fixation, the talus was removed, and articular displacement (stepoff) of the distal tibia was assessed using a digital caliper.

Results: The results indicated a lower incidence of articular displacement in chevron osteotomy (21.1%) compared to oblique osteotomy (50%). Fixation with three screws showed a lower rate of incongruence (21.1%) compared to two screws (50%). When the type of osteotomy and fixation were combined, the chevron osteotomy fixed with three screws had no measurable articular displacement in this cadaveric model.

Conclusion: In this cadaveric surgical technique model, a chevron medial malleolar osteotomy fixed with three screws showed no measurable articular displacement and overall had a lower risk of articular stepoff compared with oblique osteotomy and twoscrew fixation.

Keywords: Osteotomy; Ankle joint; Fracture fixation.

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Osteochondral lesion with subchondral cyst in the proximal phalanx of the hallux secondary to gouty tophi treated with collagen membrane (AMIC): description of technique and case report

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Gout is the most common cause of inflammatory arthritis in men, typically presenting with severe, acute pain in the first metatarsophalangeal joint. Osteochondral lesions secondary to gout are rare, and when they do occur, there is no consensus on the best treatment. The matrix-induced autologous chondrogenesis (AMIC) technique, when applied with a collagen membrane, has been shown to be an effective alternative for treating these lesions. The objective of this study was to describe the surgical treatment of an osteochondral lesion associated with a subchondral cyst, resulting from a gouty tophus in the proximal phalanx of the hallux, using the collagen membrane. Male patient, 23 years old, presenting osteochondral lesion in the proximal phalanx of the hallux, with involvement of the articular surface, secondary to a gouty tophus. Surgical treatment consisted of curettage of the subchondral cyst through a dorsal bone window, filling the defect with autologous bone graft, and repairing the lesion with collagen membrane. After a 2-year follow-up, the patient presented with complete pain resolution, with improvement on the visual analog scale (VAS) from 6 to 0 and an increase in the AOFAS score from 69 to 100. The patient fully resumed physical and daily activities without limitations. Considering a two-year follow-up period, the proposed treatment demonstrated satisfactory functional results, as evidenced by improvements in VAS and AOFAS scores.

Keywords: Collagen; Cartilage, articular; Membranes, artificial. Osteochondritis.

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How do ChatGPT and other generative artificial intelligence models perform on foot and ankle questions from the Brazilian Orthopedics and Traumatology Association's TEOT and TARO exams? The implications of large language models for medical education

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Introduction: Generative artificial intelligence (AI) is increasingly used for study and rapid consultation. We assessed how leading large language models (LLMs) perform on Brazilian Orthopedics and Traumatology Association (SBOT) Foot and Ankle exam questions.

Methods: Cross-sectional benchmarking of 107 foot and ankle questions from TEOT and TARO exams. Items were classified into the following categories: adult trauma, pediatric trauma, anatomy/imaging, physical examination, congenital/pediatric disorders, and adult disorders. Four generative AI models were queried with standardized prompts; responses were scored against the official key. Outcome: overall accuracy.

Results: ChatGPT (GPT-5 Thinking) had the highest accuracy (86.91%), followed by Gemini (79.43%). Accuracy differed by domain, with lower performance in pediatric trauma and congenital disorders. No model achieved perfect agreement with the key.

Conclusions: Popular generative AI models performed well on SBOT foot and ankle exam questions, with ChatGPT (GPT-5 Thinking) scoring highest. LLMs may be helpful adjuncts in residency education when used with supervision and critical appraisal.

Keywords: Medical education; Orthopedics; Foot.

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A novel arthroscopic classification of deltoid ligament injuries in ankle fractures and its impact on surgical management

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Introduction: Ankle fractures have an annual incidence of 0.1%-0.2% and may be associated with deltoid ligament injury in up to 58% of cases. The true prevalence and severity of these lesions may be underestimated when assessed using indirect diagnostic methods. Arthroscopy allows direct visualization of the intra-articular fascicles of the deltoid ligament, improving diagnostic accuracy. This study aimed to propose a novel arthroscopic classification of deltoid ligament injuries in acute ankle fractures and to analyze their association with Lauge-Hansen mechanisms.

Methods: A prospective observational study was conducted at a tertiary hospital between January 2022 and March 2025. A total of 229 adult patients undergoing open reduction and internal fixation with arthroscopic assistance were included. Fractures were classified according to the Lauge-Hansen system (SAD, SRE, PAB, PRE). Deltoid injuries were graded arthroscopically as: Type 0 (intact); Type 1 (tibionavicular injury with partial pre- collicular tibiotalar lesion); Type 2 (tibionavicular plus pre- and collicular tibiotalar injury); and Type 3 (complete rupture involving the entire tibiotalar fascicle).

Results: Mean age was 43.7 ± 15 years; 54.1% were male. Arthroscopic deltoid injury was identified in 42.8% (98/229). Among lesions, 31.6% were Type 1, 39.8% Type 2, and 28.6% Type 3. PRE fractures showed the highest injury rate (53.7%), followed by SRE (42.8%), PAB (28.6%), and SAD (12.5%). Increasing fracture-mechanism severity was significantly associated with a higher deltoid injury grade (coefficient = 0.395; 95% CI, 0.082-0.708; p = 0.013).

Conclusion: Deltoid ligament injuries are common and more severe in complex rotational fracture mechanisms when assessed arthroscopically. The proposed novel arthroscopic classification provides an anatomy-based, progressive framework for medial instability and may support more precise intraoperative decision-making in the management of acute ankle fractures.

Keywords: Arthroplasty, replacement, ankle; Ankle fractures; Ligaments, articular.

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Surgical outcomes of minimally invasive hallux valgus correction using 3D-printed patient-specific instrumentation: A prospective case series

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Introduction: Fourth-generation minimally invasive surgery (MIS) for hallux valgus (HV) provides recognized advantages over open techniques but remains technically demanding, with a steep learning curve and dependence on fluoroscopy. Three-dimensional (3D) printing enables the development of patient-specific guides that translate CT-based preoperative planning into the operating room, potentially improving surgical accuracy and efficiency.

Methods: This prospective single-center case series follows a predefined protocol (planned sample size 20; 3-month follow-up). An interim analysis was performed on the first eight consecutive patients (14 feet; six bilateral) undergoing primary fourth-generation metaphyseal extra-articular transverse and Akin osteotomy (META) using a CT-based 3D-printed guide. Preoperative DICOM data were segmented to generate 3D models, and osteotomy level, metatarsal translation, and screw trajectories were digitally planned. Guides were produced in biocompatible resin using stereolithography and sterilized prior to surgery. Operative time, fluoroscopy use, radiographic correction (HV angle [HVA], intermetatarsal angle [IMA]), and clinical outcomes (VAS pain, AOFAS score) were recorded.

Results: Eight patients (mean age 45.6 ± 14.8 years) comprising 14 operated feet were analyzed. Mean operative time was 32.2 ± 3.8 minutes per foot. Mean fluoroscopy shots were 68.6 ± 8.4, with a mean radiation dose of 1.64 ± 0.30 mGy. HVA improved from 26.8° ± 6.3° to 6.3° ± 5.0°, and IMA from 10.4° ± 2.8° to 4.4° ± 2.7° at three months. VAS pain decreased from 7.1 ± 0.9 to 0.2 ± 0.6, and AOFAS score increased from 67.4 ± 8.9 to 98.6 ± 3.6.

Conclusion: In this interim prospective series, fourth-generation MIS HV correction using CT-based 3D-printed patient-specific guides demonstrated acceptable operative times, low radiation exposure, substantial radiographic correction, and marked early improvements in pain and function.

Keywords: Minimally invasive surgical procedures; Printing, three-dimensional; Hallux valgus.

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Tibiofibular syndesmosis injury – comparative analysis between suture button and transyndesmal screw fixation: A systematic review with meta-analysis

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Introduction: The aim of this study was to compare the functional results obtained by the suture button and transyndesmal screw fixation techniques in the treatment of tibiofibular syndesmosis lesions.

Methods: This is a systematic review with meta-analysis registered with the International Prospective Register of Systematic Reviews (PROSPERO) under ID CRD42024512033 to improve the quality and suitability of the results for the proposed objectives.

Results: A total of 185 articles were selected during the search process; after excluding those published more than 15 years ago, 54 remained. Analysis of the titles and abstracts allowed 35 articles that did not align with the objective of this study to be excluded. A comprehensive review of 19 articles was conducted; 13 were excluded for not meeting the inclusion criteria, and six were selected for analysis.

Conclusion: Suture button therapy is as reliable and reproducible as the screw method and can be used as an alternative with similar clinical results. It remains controversial which is the best option, but suture-button therapy was associated with lower rates of second procedures, lower patient and clinical costs, and faster loading times. It may be more beneficial for patients, and consequently for orthopedic surgeons, to opt for dynamic fixation rather than the usual and traditional static fixation.

Keywords: Tibiofibular Syndesmosis of the Ankle; Ankle injuries; Suture techniques.

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Open versus arthroscopic Broström technique in chronic lateral ankle instability: updated systematic review and meta-analysis

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Introduction: The Broström repair technique is recognized as a reference in the treatment of chronic lateral ankle instability. The arthroscopic approach has been adopted as a minimally invasive alternative; however, its clinical superiority over the open technique remains controversial. The objective of this study was to compare the clinical and functional outcomes of the open and arthroscopic Broström techniques through an updated systematic review and meta-analysis, with an emphasis on recent evidence.

Methods: A systematic search was conducted in PubMed, Scopus, Web of Science, and Embase databases, in accordance with the PRISMA 2020 guidelines. Comparative clinical studies of both techniques were included. The primary endpoint analyzed was the AOFAS score. A random effects model was used for quantitative synthesis.

Results: Seven comparative studies were included, totaling 413 patients. The arthroscopic technique showed a statistically significant advantage in the AOFAS score (mean difference +2.4; 95% CI 1.1-3.7; $p < 0.001$; $I^2 = 28\%$). The rates of postoperative complications and the time of return to activity were similar between open and arthroscopic techniques.

Conclusion: Broström arthroscopic repair has a small statistical functional advantage; however, the magnitude of this difference is probably below the threshold of minimal clinical relevance. Both approaches yield long-term functional outcomes and are relatively equivalent in treating chronic ankle instability.

Keywords: Joint instability; Lateral ligament, ankle; Artrhroscopy,

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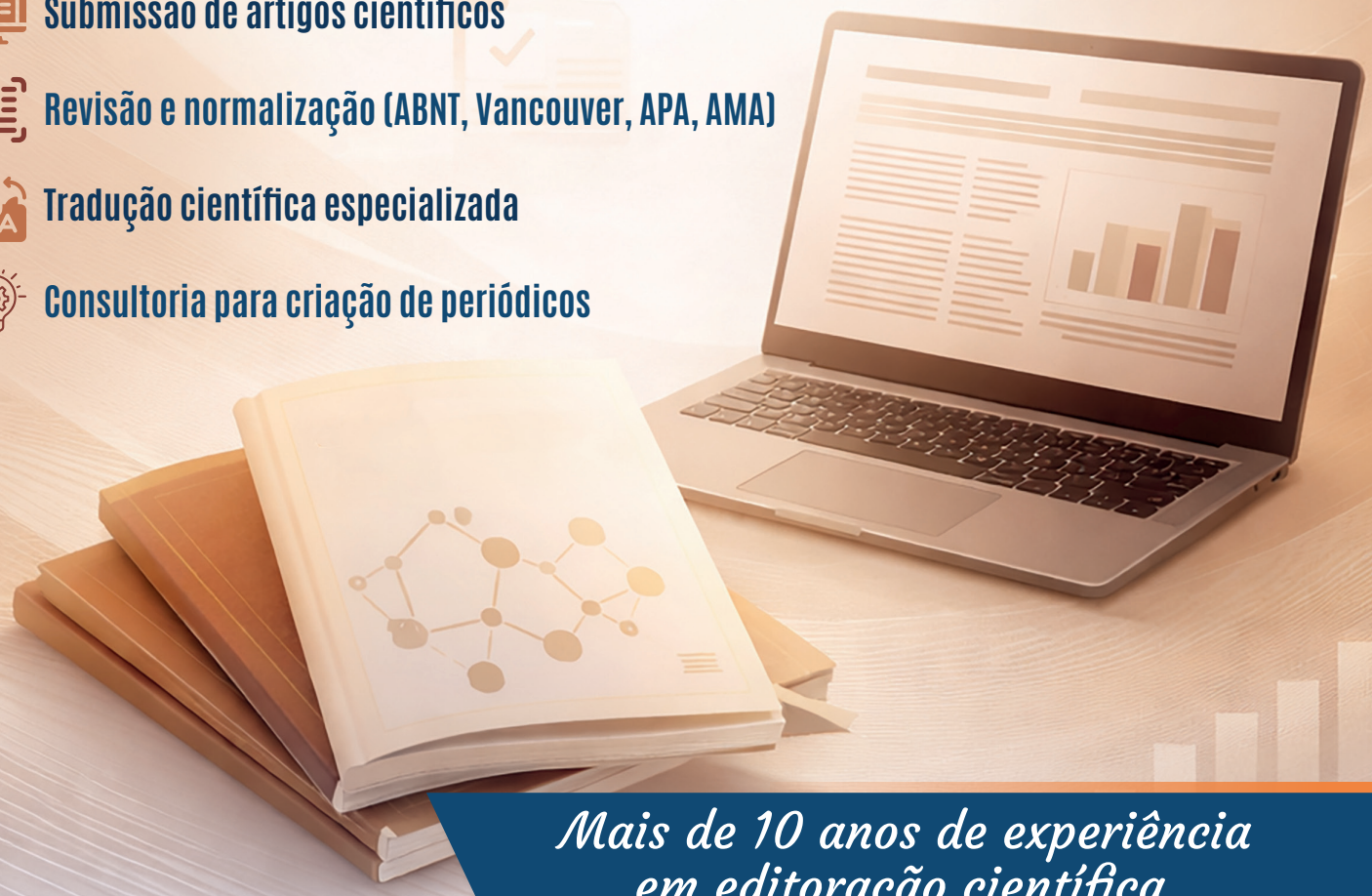

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