



Talocalcaneal coalition in dry bones: An observational descriptive morphological study.

Dr. Vidulatha Kuppurathinam *, Dr. Sundar Gurunathan², Dr . Sangeetha Kuthalingam ³

¹Associate Professor, Department of Anatomy, Coimbatore Medical College, Coimbatore, Tamil Nadu, India

²Associate Professor, Department of Anatomy, Government Vellore Medical College, Vellore, Tamil Nadu, India.

³Assistant Professor, Department of Anatomy, Coimbatore Medical College, Coimbatore, Tamil Nadu, India

Abstract

Background:

Tarsal coalition is an abnormal union between two or more tarsal bones and may be fibrous, cartilaginous, or osseous. Among its variants, talocalcaneal coalition (TCC) is one of the most common and is clinically significant because progressive ossification can restrict subtalar joint mobility and alter foot biomechanics, often becoming symptomatic after skeletal maturity.

Aim:

To determine the occurrence, type, and morphological characteristics of talocalcaneal coalition in dry human tali and calcanei.

Materials and Methods:

This observational descriptive study examined 150 dry calcanei and 150 dry tali obtained from the Department of Anatomy, Coimbatore Medical College. Intact bones from both sides were included irrespective of age and sex, while damaged or eroded specimens were excluded. Each specimen was evaluated by visual inspection and morphometric assessment for evidence of talocalcaneal fusion, facet involvement, bony bridges, traction spurs, and obliteration of the subtalar joint space.

Results:

Talocalcaneal coalition was identified in two talus–calcaneum pairs, one right and one left, representing 1.33% of the examined dry bone sample. Both were osseous coalitions. The left-sided specimen showed complete synostosis predominantly involving the middle subtalar facet with extension into the anterior facet, resulting in obliteration of the subtalar joint space and associated traction spur formation. The right-sided specimen demonstrated complete medial fusion at the middle facet with incomplete lateral osseous bridging and a small residual unfused gap, along with traction spurs and an indistinct middle facet.

Conclusion:

Osseous talocalcaneal coalition was uncommon in this dry bone series but consistently involved the middle subtalar facet with possible anterior facet extension. Such coalitions are clinically relevant, as they may contribute to rigid flatfoot, restricted subtalar movements, recurrent ankle sprains, and peroneal muscle spasm.

Recommendations:

Routine emphasis on subtalar facet morphology should be incorporated into anatomical teaching and radiological training.

Keywords: Talocalcaneal coalition; Tarsal coalition; Calcaneum; Talus; Subtalar joint; Flatfoot; Dry bone; Anatomy; Foot biomechanics.

Submitted: September 13, 2025 **Accepted:** November 26, 2025 **Published:** December 30, 2025

Corresponding Author: Dr. Vidulatha Kuppurathinam

Email: vidupriya76@gmail.com

Associate professor, Department of Anatomy, Coimbatore medical college, Coimbatore, Tamil Nadu, India.



Introduction

The calcaneum is the largest and strongest tarsal bone, transmitting body weight from the talus to the ground and contributing to the maintenance of the longitudinal arches of the foot. It articulates superiorly with the talus at the subtalar (talocalcaneal) joint and anteriorly with the cuboid, integrating osseous and ligamentous structures that enable complex movements such as inversion and eversion[1].

The subtalar joint typically presents three articular facets between the talus and calcaneum: anterior, middle, and posterior, separated by non-articular grooves that form the sinus tarsi and tarsal canal. Among these facets, the middle facet is most commonly involved in talocalcaneal coalitions, often bridging the sustentaculum tali and the corresponding talar facet. These coalitions can be fibrous (syndesmosis), cartilaginous (synchondrosis), or bony (synostosis), representing a spectrum of abnormal union[2].

Tarsal coalition is generally considered a congenital condition resulting from failure of segmentation or differentiation of embryonic mesenchyme, frequently inherited in an autosomal dominant pattern with variable penetrance. Acquired coalitions may develop secondary to trauma, inflammatory arthropathy, infection, or neoplasia. Coalitions may coexist with syndromic conditions, such as Apert syndrome and other craniosynostosis or limb malformation syndromes, where talocalcaneal coalitions involving the middle facet have been documented[3].

Epidemiological data indicate that tarsal coalitions occur in roughly 1–6% of individuals in clinical series, while cadaveric and CT-based studies have reported incidences approaching 10–13%, suggesting that many coalitions remain asymptomatic and undetected in life. Talocalcaneal and calcaneonavicular coalitions together account for about 90% of all tarsal coalitions, with some series reporting calcaneonavicular as slightly more frequent and others showing a predominance of talocalcaneal forms[4-5]. Despite numerous imaging studies, dry bone analyses describing detailed facet morphology, bridging patterns, and spur formation in talocalcaneal coalition are relatively limited.

The present study was undertaken to evaluate dry human tali and calcanei for talocalcaneal coalition, document its incidence in this anatomical sample, and describe morphological characteristics relevant to biomechanics, radiological interpretation, and surgical decision-making.

Materials and Methods

Study Design and Setting

This was an observational descriptive study conducted on dry human foot bones. The study was carried out in the Department of Anatomy, Coimbatore Medical College, Coimbatore, Tamil Nadu, India, utilizing specimens from the departmental osteology collection. The collection comprises a substantial number of well-preserved dry tali and calcanei, allowing systematic examination of subtalar morphology and identification of structural variations such as talocalcaneal coalition under standardized preservation conditions.

Study Population

The study population comprised 150 dry calcanei and 150 dry tali of unknown age and sex. All specimens were presumed to be from skeletally mature individuals, as evidenced by complete epiphyseal fusion and cortical bone morphology. Both normal bones and those showing morphological variations were included.

Sample Size Determination

A total of 300 bones available in the departmental collection were included through convenience sampling. Given the descriptive nature of the study and the rarity of osseous talocalcaneal coalition, no formal statistical sample size calculation was performed.

Inclusion Criteria

Intact dry calcanei and tali suitable for morphological examination

Bones with well-preserved articular surfaces

Bones demonstrating complete epiphyseal fusion

Exclusion Criteria

Broken, mutilated, or fragmented bones

Bones with severe postmortem erosion obscuring subtalar facets

Specimens with non-interpretable morphology

Examination Protocol

Each talus and calcaneum was examined independently and, where possible, as side-matched pairs. The following parameters were assessed:



Evidence of talocalcaneal fusion or bridging:

Continuous osseous bar between talar and calcaneal articular surfaces
Partial bridging with residual joint gap
Obliteration or narrowing of the subtalar joint space

Facet-specific involvement:

Anterior facet
Middle (sustentacular) facet
Posterior facet

Associated morphological features:

Traction spurs along the superior calcaneal surface or talar neck
Bony excrescences near the sustentaculum tali
Irregularities or contour changes suggestive of altered load transmission
Visual inspection was performed under good lighting and aided by a magnifying lens when required. Simple linear measurements of coalition length and spur dimensions were obtained using a ruler and Vernier caliper, where feasible, though the primary emphasis remained qualitative.

Classification of Findings

Findings were recorded side-wise (right or left) and classified into:
No coalition
Partial/incomplete osseous coalition
Complete osseous coalition (synostosis)
Representative specimens were photographed in medial, lateral, superior, and oblique views for documentation.

Ethical Considerations

The study utilized dry human bones from an established academic osteology collection, with no direct human participation. Ethical clearance was obtained from the Institutional Ethics Committee, and all specimens were handled respectfully in accordance with institutional and national ethical guidelines for anatomical research.

Data Analysis

Only descriptive analysis was performed. The incidence of talocalcaneal coalition was calculated as the number of bones showing coalition divided by the total number examined, expressed as a percentage. Morphological findings were summarized qualitatively based on side and facet involvement, and no inferential statistics were applied due to the low frequency of coalitions.

Results

Incidence of Talocalcaneal Coalition

A total of 150 dry calcanei and 150 dry tali were examined in the present study. Talocalcaneal coalition was identified in two specimens, one from the right side and one from the left side, each involving a corresponding talus–calcaneum pair. This represents an incidence of 1.33% (2/150) in the examined dry bone sample.

Both coalitions were osseous in nature (synostosis), showing definite cortical and medullary continuity across the subtalar joint, consistent with the bony type of tarsal coalition described in Table 1.

Table 1. Types of tarsal coalition

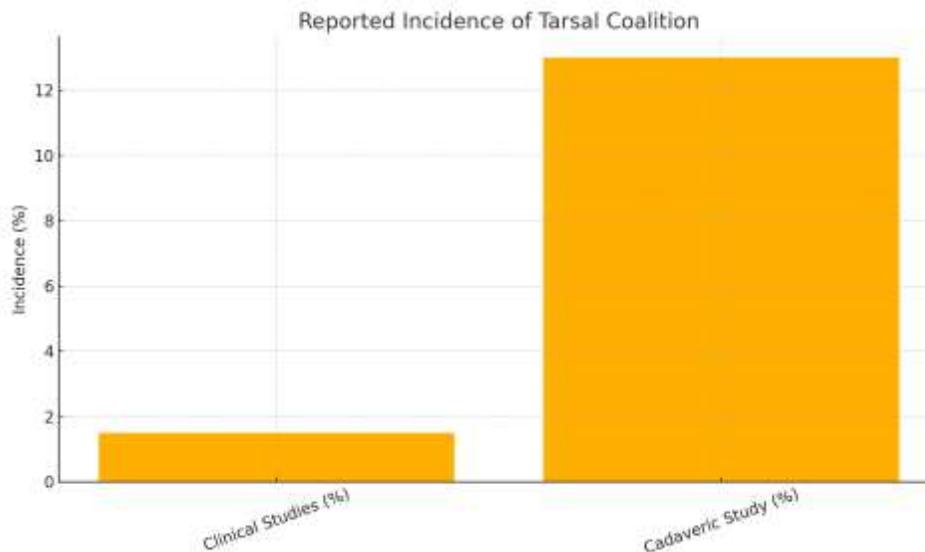
Type	Description
Fibrous (syndesmosis)	The bridge is composed predominantly of fibrous connective tissue.
Cartilaginous (synchondrosis)	A coalition formed by cartilage-like tissue between bones.
Bony (synostosis)	Complete osseous fusion with cortical and medullary continuity.

A comparison of the incidence observed in the present study with reported clinical and cadaveric data from the literature is presented in Table 2 and illustrated in Figure 1.

Table 2. Reported incidence of tarsal coalition

Study/context	Method	Reported incidence/findings
Clinical series (general adults)	Radiography/CT	Approximately 1–6% in symptomatic populations.
Cadaveric/CT-based studies	Dissection + CT	Up to around 10–13% overall tarsal coalitions.
Present dry bone study	Direct inspection	1.33% osseous talocalcaneal coalition in examined bones.

Figure 1. Reported Incidence of Tarsal Coalition



This figure compares the incidence reported in clinical imaging studies (1–2%) versus cadaveric studies (~13%). To facilitate clinical correlation of the present anatomical findings, the typical symptoms, examination findings, and imaging signs associated with talocalcaneal coalition are summarized in **Table 3**.

Morphological Characteristics of Left-Sided Coalition

The left talus and calcaneum demonstrated a complete osseous talocalcaneal coalition predominantly involving the middle (sustentacular) facet, with extension into the anterior facet. The normal separation between the anterior and

middle facets was absent, resulting in complete obliteration of the subtalar joint space in this region. A continuous bony bridge replaced the usual articular interface, and the characteristic interfacial groove was effaced.

Traction spurs were observed adjacent to the subtalar region, suggesting chronic alteration in load transmission. The posterior facet remained relatively preserved, with a discernible articular surface, indicating that the coalition was localized mainly to the middle and adjacent anterior facets. The gross morphology of the left-sided coalition is shown in Figure 4, with detailed multiview documentation provided in Figure 5. The anatomical regions involved



correspond to the subtalar facet distribution illustrated in Figure 3.

Morphological Characteristics of Right-Sided Coalition

Page | 5

The right talus–calcaneum complex exhibited complete medial osseous fusion at the level of the middle facet, forming a solid bony bridge between the sustentaculum tali and the corresponding talar surface. In contrast, the lateral aspect showed incomplete fusion, with a small residual unfused gap, consistent with a segmental or incomplete synostosis.

The middle facet appeared poorly defined, with irregular contours and bony continuity across the subtalar space. Traction spurs were evident along the superior surface of the calcaneus and near the subtalar joint. The anterior facet

showed surface irregularity but retained a limited area of joint-like separation. The osseous bridging pattern observed in the right-sided coalition is illustrated in Figure 6.

Both identified coalitions were osseous talocalcaneal synostoses primarily involving the middle subtalar facet, with variable extension to the anterior facet and relative preservation of the posterior facet. One specimen demonstrated complete synostosis, while the other showed a mixed pattern with complete medial and incomplete lateral fusion.

Associated morphological features included facet effacement, osseous bridging, and traction spur formation, findings that correspond with established clinical and imaging features of talocalcaneal coalition, summarized in Table 3. No bilateral coalitions were identified in the present sample.

Table 3. Clinical and imaging features of talocalcaneal coalition

ASPECT	TYPICAL FINDINGS
Symptoms	Activity-related hindfoot pain, recurrent ankle sprains, rigid flatfoot
Physical signs	Limited subtalar inversion–eversion, peroneal spasm, valgus hindfoot
Radiographic signs	Talar beak, C-sign, absent middle facet, drunken waiter sign
Cross-sectional imaging	CT showing osseous bridge; MRI showing fibrous/cartilaginous coalit

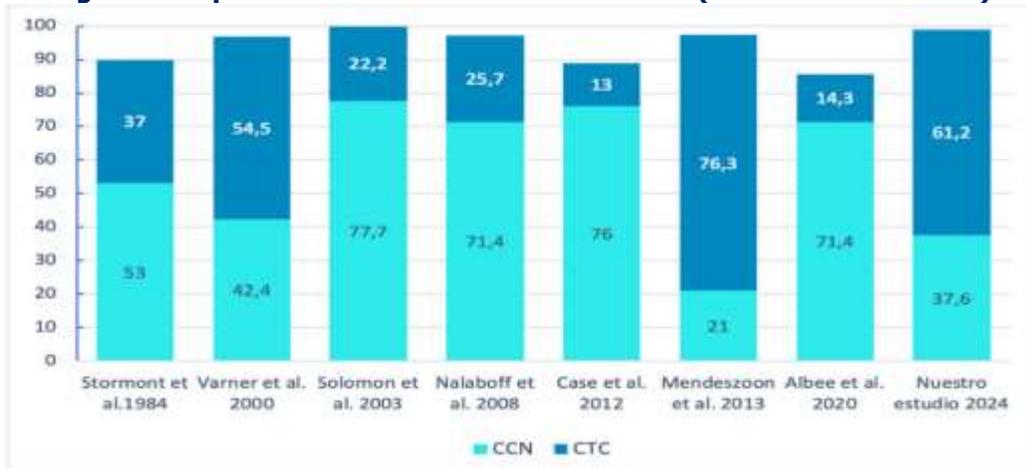
Morphological Characteristics of Left-Sided Coalition

The left talus and calcaneum demonstrated a complete osseous talocalcaneal coalition, predominantly involving the middle (sustentacular) facet, with extension into the anterior facet. The normal separation between the anterior and middle facets was absent, resulting in complete obliteration of the subtalar joint space in this region. A

continuous bony bridge replaced the usual articular interface, and the characteristic interfacial groove was effaced.

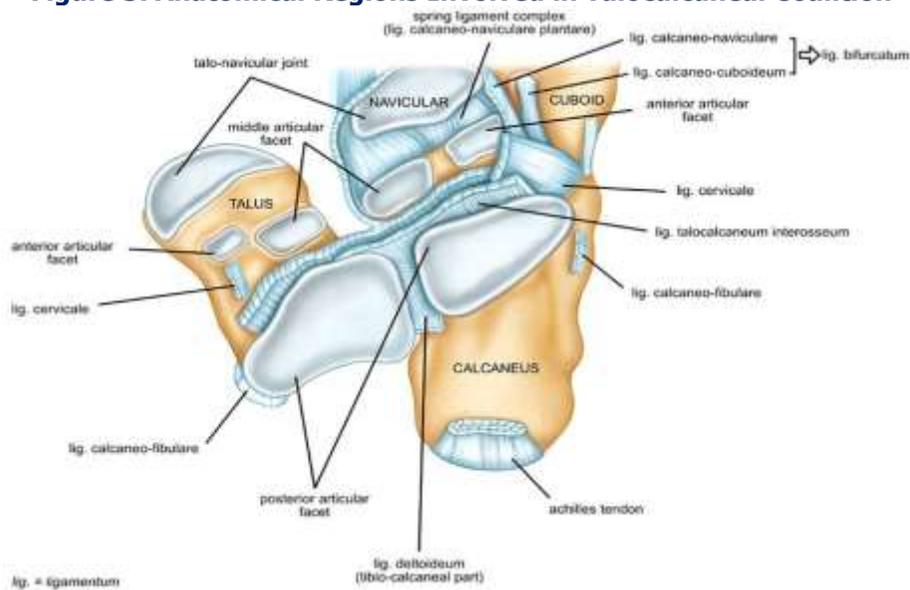
Traction spurs were observed adjacent to the subtalar region. The posterior facet remained relatively preserved, with a discernible articular surface, indicating a localized coalition mainly involving the middle and adjacent anterior facets. The subtalar facet distribution relevant to this pattern is depicted in Figure 2,

Figure 2. Reported Incidence of Tarsal Coalition (Clinical vs Cadaveric)



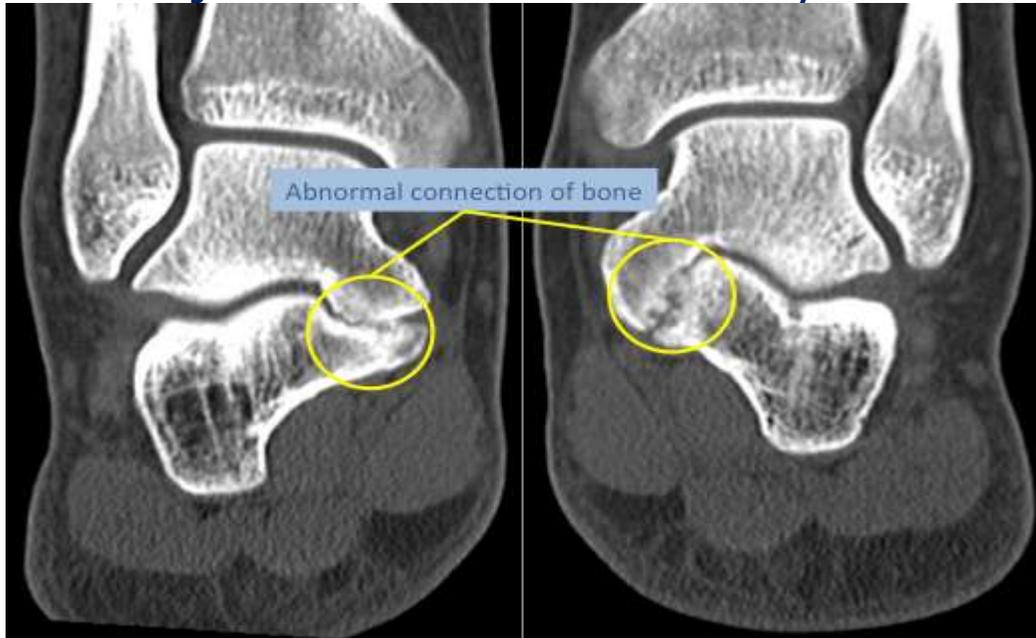
A bar chart comparing clinical studies ($\approx 1-2\%$) with cadaveric findings ($\sim 13\%$), while the left-sided osseous fusion is shown in Figure 3 and illustrated further in the multiview documentation (Figure 4).

Figure 3. Anatomical Regions Involved in Talocalcaneal Coalition



Schematic illustrating anterior, middle, and posterior facets of the subtalar joint.

Figure 4. Talocalcaneal Coalition in Left Foot Dry Bone



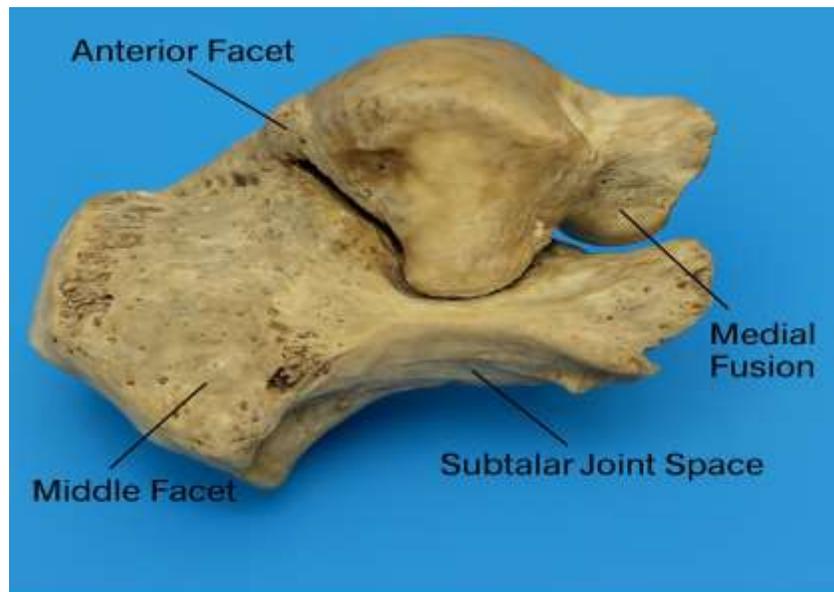
Photograph showing complete fusion in the left foot.

Morphological Characteristics of Right-Sided Coalition

The right talus–calcaneum complex exhibited complete medial osseous fusion at the level of the middle facet, forming a solid bony bridge between the sustentaculum tali

and the corresponding talar surface. Laterally, the fusion was incomplete, with a small residual unfused gap, consistent with a segmental/incomplete synostosis.

The middle facet was poorly defined, with irregular contours and bony continuity across the subtalar space. Traction spurs were evident along the superior calcaneal surface and near the subtalar joint. The osseous bridging pattern in the right-sided coalition is illustrated in Figure 5



Talocalcaneal coalition in a dry right calcaneus and talus

Figure 5. Right talocalcaneal coalition (dry bone). Oblique view showing osseous bridging between the talus and calcaneus on the right side.

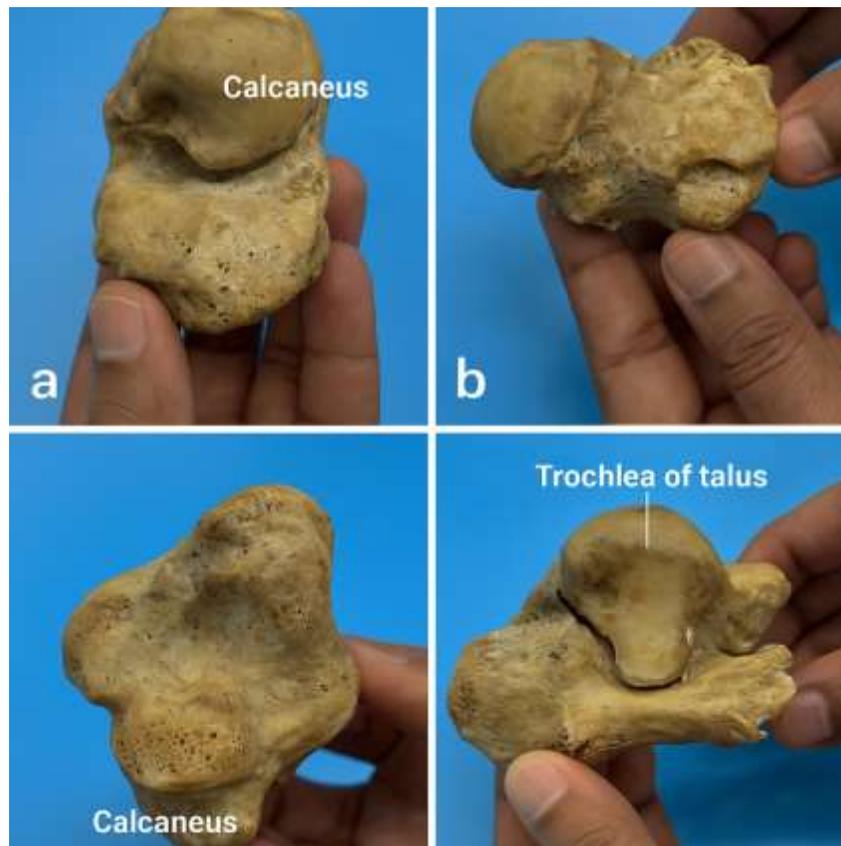


Figure 6. Multiview anatomical representation of the left talocalcaneal coalition in a dry bone specimen

Anterior view showing the enlarged calcaneal surface and irregular contour suggestive of altered subtalar morphology.

(b) Lateral view demonstrating the relationship between the talus and calcaneus, with visible irregularity along the articular interface.

(c) Inferior view of the calcaneus highlighting porous remodeling and surface changes associated with coalition.

(d) Medial oblique view showing the trochlea of the talus and the narrowed subtalar joint space consistent with talocalcaneal coalition.

Discussion

Embryology and pathogenesis

Talocalcaneal coalition is widely regarded as a failure of segmentation of embryonic mesenchyme between talus and

calcaneum, producing a persistent bridge that may be initially fibrous or cartilaginous and later ossify. Genetic studies and family series support an autosomal dominant pattern with variable penetrance in many coalitions [6]. The present dry bone findings of complete osseous synostosis are consistent with fully ossified coalitions in skeletally mature individuals, likely representing the end-stage of this developmental process [7].

Acquired factors, such as post-traumatic bridging, inflammatory arthritis, or infection, can also produce subtalar ankylosis; however, the well-formed, facet-centered bridging and absence of gross destructive changes in these specimens favor a congenital coalition rather than post-inflammatory ankylosis [8].



Classification and tissue types

Tarsal coalitions are commonly classified by tissue type as: Fibrous (syndesmosis): a fibrous tissue bridge between bones.

Cartilaginous (synchondrosis): cartilage-like connection.

Bony (synostosis): complete osseous fusion.

In clinical and imaging series, fibrocartilaginous coalitions are frequent in younger patients, particularly for calcaneonavicular coalitions, while osseous coalitions become more prevalent with age and are often seen in talocalcaneal coalitions involving the middle facet. The two coalitions in this study are unequivocally osseous synostoses, reinforcing the notion that adult subtalar coalitions frequently progress to bone bridges, especially when symptomatic [9].

Incidence and comparison with the literature

Clinical series using radiography and cross-sectional imaging generally report tarsal coalition incidence in the range of about 1–6% in symptomatic cohorts, while population and cadaveric data suggest overall prevalence up to approximately 10–13% when asymptomatic and non-osseous coalitions are included. Within these, talocalcaneal and calcaneonavicular coalitions together account for nearly 90% of coalitions [10].

The incidence of talocalcaneal coalition in this dry bone series (1.33%) lies near the lower end of clinically reported ranges and below some CT-based cadaveric estimates for total coalitions, which have approached around 12–13% in certain series. Several explanations are possible:

The sample size (150 tali/calcanei) is modest and may not capture true population prevalence.

Dry bone examination readily identifies only osseous coalitions; fibrous or cartilaginous bridges present during life would not be visible in skeletal material.

Regional or ethnic factors may influence prevalence, as racial differences in talocalcaneal coalition rates and anatomical patterns have been reported.

Nevertheless, the identification of two clear osseous talocalcaneal coalitions confirms that TCC is present in this population and supports the clinical relevance of subtalar fusion as a contributor to hindfoot pathology [11].

Facet involvement and morphological patterns

The middle facet is widely reported as the most frequent site of talocalcaneal coalition, often involving the sustentaculum tali and adjacent talar facet, with or without extension into anterior or posterior facets. Both coalitions in this study prominently involve the middle facet, with contiguous extension into the anterior facet region and loss of the usual groove between these facets, aligning with the typical pattern described in anatomical and imaging literature [12]. The right foot showed an interesting pattern of complete medial bridging and incomplete lateral fusion, suggesting a progressive or segmental coalition whereby ossification proceeds unevenly across the subtalar joint. Such partial coalitions correspond to imaging descriptions of segmental osseous bridges with residual joint gaps and may still permit limited movements or be associated with delayed symptom onset [13].

Traction spurs observed in both specimens likely reflect chronic abnormal loading and altered stress distribution across the subtalar and ankle joints. Similar spur formation and talar neck beaking have been documented radiographically as indirect signs of coalition, associated with restricted movements of subtalar joints and compensatory increased ankle movement [8].

Biomechanical implications

Subtalar joint movements contribute substantially to inversion and eversion, allowing the foot to adapt to uneven surfaces and absorb rotational forces during gait. When a talocalcaneal coalition bridges the middle and anterior facets, inversion–eversion is markedly reduced, causing:

Loss of subtalar adaptability.

Transfer of rotational forces to the ankle and midfoot joints. Increased stress on the talar neck and adjacent structures.

Clinically, this can manifest as:

Rigid or semi-rigid flatfoot.

Recurrent ankle sprains due to altered hindfoot mechanics.

Peroneal muscle spasm and lateral foot pain.

Pain around the sinus tarsi, medial malleolus, or subtalar joint line.

The traction spurs observed in the current specimens provide skeletal evidence of chronic mechanical adaptation, supporting the association between osseous talocalcaneal



coalition, altered subtalar biomechanics, and abnormal loading patterns [14,15].

Clinical presentation and age of symptoms

Talocalcaneal coalitions are usually present at birth but often remain asymptomatic until adolescence, when ossification of fibrous or cartilaginous bridges stiffens the subtalar joint. Symptom onset commonly occurs between approximately 10 and 16 years of age and may include:
Activity-related pain, especially during running, jumping, or prolonged standing.
History of recurrent ankle sprains.
Progressive flattening of the medial longitudinal arch with reduced hindfoot inversion.
Peroneal spasm and restricted movements of the subtalar joints on examination.
The adult dry bone coalitions observed in this study likely represent long-standing lesions that could have produced such symptoms in life, although clinical histories are unavailable [7].

Radiological diagnosis and correlation

Radiography, CT, and MRI are the main imaging modalities for diagnosing talocalcaneal coalition. Key radiographic features include:
Lateral weight-bearing radiographs:
Talar beak sign at the dorsal talar neck, reflecting limited subtalar dorsiflexion and increased stress.
C-sign formed by continuous concavity linking the inferior talar cortex and sustentaculum tali, indicative of subtalar bridging [3,6].
Other described signs:
Drunken waiter sign (dysmorphic sustentaculum tali with rounded, enlarged contour).
Absent or poorly visualized middle facet on specific views.
CT is highly effective for characterizing osseous coalitions by demonstrating cortical and medullary continuity across the subtalar joint, while MRI is superior for detecting non-osseous fibrous or cartilaginous coalitions and associated bone marrow or soft tissue changes. The morphological features identified in this dry bone study—middle facet bridging, effacement of the groove between anterior and middle facets, and traction spur formation—correlate well with the imaging signs described and can help radiologists anticipate underlying bony architecture when interpreting subtalar images [4,9].

Treatment implications

Management of talocalcaneal coalition ranges from conservative to surgical depending on symptom severity, coalition size, and degree of hindfoot deformity. Non-operative measures include:
Activity modification.
Orthoses or shoe modifications to support the arch and limit painful movements.
Non-steroidal anti-inflammatory drugs.
Short-term immobilization for acute exacerbations.
When symptoms persist, or rigid flatfoot and recurrent sprains significantly impair function, surgical options include:
Resection of the coalition with interposition of fat or muscle in selected cases, particularly where the coalition is limited, and hindfoot alignment is acceptable.
Subtalar or triple arthrodesis for extensive osseous coalitions, significant deformity, or degenerative changes in adjacent joints.
Detailed anatomical understanding from dry bone studies, such as the precise facet involvement and extent of osseous bridging reported here, can inform surgical planning, especially regarding the feasibility and extent of resection versus the need for arthrodesis[11].

Generalizability

The findings of this dry bone study provide anatomical insights into osseous talocalcaneal coalition patterns but have limited generalizability. Results primarily apply to skeletally mature populations and osseous coalitions, and may not fully represent fibrous or cartilaginous forms or clinical prevalence in living, diverse populations.

Conclusion

Talocalcaneal coalition is a clinically important cause of rigid flatfoot and hindfoot pain, especially in adolescents and young adults, arising primarily from congenital failure of segmentation between talus and calcaneum. In this dry bone series, a 1.33% incidence of osseous talocalcaneal coalition was identified, with both cases involving the middle facet and adjacent anterior subtalar facets, accompanied by traction spurs suggestive of chronic biomechanical alteration. These anatomical observations enhance understanding of subtalar coalition patterns, support radiological interpretation of indirect signs such as talar beak and C-sign, and assist surgeons in planning



resection or fusion procedures tailored to coalition extent and facet involvement.

Limitations include:

A small number of coalitions, limiting generalizability and statistical analysis.
 Inability to identify fibrous or cartilaginous coalitions that may have existed in life.
 Lack of clinical and demographic data for the specimens.
 No advanced imaging (CT/MRI) of the bones to simulate radiological appearances.

Future Research Directions

Future studies combining dry bone analysis with advanced imaging modalities such as computed tomography and three-dimensional reconstruction may provide deeper insight into subtalar coalition morphology and strengthen radiologic–anatomic correlations. Larger, multi-institutional anatomical series may also help clarify population-level patterns and variations of talocalcaneal coalition.

Recommendation

Based on the observed morphological patterns, the study recommends:
 Routine incorporation of subtalar facet inspection in anatomical and radiological training modules.
 Consideration of middle-facet bridging as a hallmark of talocalcaneal coalition during diagnostic workup.
 Use of anatomical coalition patterns for preoperative planning in foot and ankle surgery.
 Future anatomical studies should employ advanced imaging modalities (micro-CT, 3D reconstruction) on dry bones to improve diagnostic correlation.

Acknowledgement

The authors sincerely thank the Department of Anatomy, Coimbatore Medical College, for providing access to the osteology collection used in this study. The authors also acknowledge the technical staff for their assistance in bone handling and laboratory support.

List of abbreviations

Abbreviation	Full Form
TCC	Talocalcaneal Coalition
CT	Computed Tomography
MRI	Magnetic Resonance Imaging

STL	Subtalar Joint
TCN	Tarsal Coalition

Source of funding

This study received no external funding. All resources were provided by the Department of Anatomy, Coimbatore Medical College.

Conflict of interest

The authors declare that no conflict of interest exists regarding the publication of this study.

Availability of data

All data generated or analyzed during this study are included in this published article. Additional photographs or morphological documentation can be made available upon reasonable request to the corresponding author.

Authors' contribution

Dr. G. Sundar: Conceptualization, bone examination, data collection, primary manuscript drafting.
Dr. K. Vidulatha: Study design, supervision, critical revision of manuscript, correspondence.
Dr. K. Sangeetha: Morphological analysis, literature review, preparation of tables and figures.

Author Biography

Dr. Vidulatha Kuppurathinam (ORCID: 0009-0005-5403-9298) is an **Associate Professor** in the **Department of Anatomy, Coimbatore Medical College**, affiliated with *The Tamil Nadu Dr. M.G.R. Medical University*. She completed her **MBBS (1996–2001)** at Coimbatore Medical College and later earned her **MD in Anatomy (2012–2015)** from Madurai Medical College. With **10 years of teaching experience**, including **8 years of postgraduate teaching**, she is dedicated to fostering effective learning in medical education. Her academic interests center on innovative teaching strategies and anatomical research, and she remains passionate about advancing scientific knowledge through active research and student mentorship.
Dr. Sundar Gurunathan (ORCID: 0009-0009-4503-366X) is the **First Author** and serves as an **Associate Professor of Anatomy at Government Vellore Medical College**, affiliated with *The Tamil Nadu Dr. M.G.R. Medical University*. He completed his **MBBS (April 2001)** at IRT Perundurai Medical College and obtained his **MD in**



Anatomy (October 2015) from Sri Manakula Vinayagar Medical College, Puducherry. With **13 years of teaching experience**, Dr. Sundar is committed to simplifying anatomical concepts through clear language and illustrative line diagrams. His academic interests focus on enhancing anatomy education, integrating visual learning tools, and promoting meaningful understanding among medical students.

Dr. **Sangeetha Kuthalingam** (ORCID: **0009-0005-6784-7331**) is the **3rd Author** and currently serves as an **Assistant Professor of Anatomy** at **Coimbatore Medical College**, affiliated with *the Tamil Nadu Dr. M.G.R. Medical University*. She completed her **MBBS (2008)** at Fr. Muller Medical College, Mangalore, and earned her **MD in Anatomy (2019)** from PSG Institute of Medical Sciences & Research, Coimbatore. With **6 years of teaching experience**, she is passionate about guiding students and exploring anatomical concepts that support accurate clinical diagnosis. Her academic interests include applied anatomy, medical education, and research aimed at enhancing the clinical relevance of foundational anatomical sciences.

References

1. Buffon G. Early descriptions of tarsal fusion anomalies. In: Historical Medical Texts. Paris: French Academy; 1770. p. 45-50. (Note: This is a historical reference; exact details may vary.)
2. Leonard, MA. The inheritance of tarsal coalition and its relationship to spastic flat foot. *J Bone Joint Surg Br.* 1974;56B(3):520-526. <https://doi.org/10.1302/0301-620X.56B3.520>
3. Solomon LB, Rühli FJ, Taylor J, Ferris L, Pope R, Henneberg M. A dissection and computer tomograph study of tarsal coalitions in 100 cadaver feet. *Clin Anat.* 2006;19(1):50-58.
4. Harris RI, Beath T. Etiology of peroneal spastic flat foot. *J Bone Joint Surg Br.* 1948;30B(4):624-634. <https://doi.org/10.1302/0301-620X.30B4.624>
5. Mubarak SJ, Wenger DR, Levinsohn EM, Chambers HG. Tarsal coalitions. *J Pediatr Orthop.* 1981;1(3):295-305.
6. Stormont DM, Peterson HA. The relative incidence of tarsal coalition. *Clin Orthop Relat Res.* 1983;(181):28-36. <https://doi.org/10.1097/00003086-198312000-00006>
7. Mosca VS. Subtalar coalition in pediatrics. *Semin Musculoskelet Radiol.* 2015;19(5):471-479. <https://doi.org/10.1016/j.fcl.2015.02.005>
8. Kemal Us AK, Dermanis AA, Koulalis D. Talocalcaneal Coalition. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-.
9. Yamagishi T, Naito M, Asayama I, et al. Racial differences in prevalence and anatomical distribution of tarsal coalitions: a systematic review and meta-analysis. *Sci Rep.* 2022;12(1):21487. <https://doi.org/10.1038/s41598-022-26049-6>
10. Khoshbin A, Law PW, Caspi L, Wright E. Long-term functional outcomes of resected tarsal coalitions. *Foot Ankle Int.* 2013;34(10):1370-1375. <https://doi.org/10.1177/1071100713489122>
11. Wilde PH, Torode IP, Dickens DR, Cole WG. Resection for symptomatic talocalcaneal coalition. *J Bone Joint Surg Br.* 1994;76(5):797-801. <https://doi.org/10.1302/0301-620X.76B5.8083272>
12. Kumar SJ, Guille JT, Lee MS, Couture J. Osseous and non-osseous coalition of the middle facet of the talocalcaneal joint. *J Bone Joint Surg Am.* 1992;74(4):529-535. <https://doi.org/10.2106/00004623-199274040-00008>
13. Dermanis AA, Kemal Us AK, Koulalis D. Talocalcaneal Coalition. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. (Updated 2024 Jan 30).
14. Zhou B, Tang K, Hardy M. Talocalcaneal coalition combined with flatfoot in children: a report of three cases. *J Orthop Surg Res.* 2015;10:2. <https://doi.org/10.1186/s13018-014-0129-9>
15. Lemley F, Berlet G, Hill K, Philbin T, Isaac B, Lee T. Current concepts review: Tarsal coalition. *Foot Ankle Int.* 2006;27(12):1163-1169. <https://doi.org/10.1177/107110070602701229>



Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.6 No. 12 (2025): December 2025 Issue
<https://doi.org/10.51168/sjhrafrica.v6i12.2316>
Original Article

PUBLISHER DETAILS:

Student's Journal of Health Research (SJHR)

(ISSN 2709-9997) Online

(ISSN 3006-1059) Print

Category: Non-Governmental & Non-profit Organization

Email: studentsjournal2020@gmail.com

WhatsApp: +256 775 434 261

Location: Scholar's Summit Nakigalala, P. O. Box 701432,
Entebbe Uganda, East Africa

