Original Article

To Study the Surgical Treatment of Stress Fracture and Avn of Sesamoid Bone

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Abstract

Background: Research on the surgical treatment of stress fractures and AVN of the sesamoid bone is the goal of this paper. **Material and Methods:** A group of twenty individuals who exhibited clinical indications of avascular necrosis of the sesamoids had a dynamic assessment of blood circulation using a high-resolution gamma chamber equipped with a rectangular double detector. The purpose of doing this test was to ascertain the presence or absence of the ailment among the patients. The examination was conducted with both frontal and lateral projections of the patient's area of interest. **Results:** The age range of the patients included in the study spanned from 18 to 51 years, with a mean age of 30.52±3.69 years. The sample consisted of 20 patients, of which 16 (80%) were female and 4 (20%) were male. Out of the total sample size of 20 patients, it was observed that 8 individuals, constituting 40% of the participants, presented with a pathological state in their right foot. Conversely, 12 patients, accounting for 60% of the cohort, exhibited a pathological condition in their left foot. Each individual displayed the sensation of discomfort in the affected forefoot, and further examination revealed that three individuals, constituting 15% of the sample, also presented with localised edoema and rubor. Out of the sample population, 12 patients (representing 60% of the sample) exhibited undivided sesamoids, whereas 6 patients (representing 30% of the sample) had bipartite tibial sesamoids. Additionally, 2 patients (representing 10% of the sample) demonstrated bipartition of both the tibial and fibular sesamoids. In a sample of patients, it was observed that the tibial sesamoid was affected in 11 individuals, accounting for 55% of the cases, while the fibular sesamoid was influenced in 9 people, representing 45% of the cases. It was determined that each patient was donning footwear that was ill-suited for their individual foot structure, and/or the patients self-reported experiencing traumatic incidents, with or without accompanying fractures. Out of the total patient population, five individuals were engaged in dancing activities, while one patient participated in football. Out of the total number of female patients observed, specifically two individuals or fifty percent, were found to be utilising any form of contraceptive method. Twelve patients, about 60% of the total, did not experience any relief of symptoms. In these cases, surgical excision of the necrotized sesamoid tissue was necessary. Three individuals experienced the emergence of discomfort, edoema, and localised paresthesia, ultimately resulting in a minor degree of claudication. **Conclusions:** The current body of research lends credence to the idea that early non-surgical care of instances with avascular necrosis of the sesamoid should be pursued. The recommended treatment regimen would encompass the utilisation of anti-inflammatory pharmaceuticals, the utilisation of suitable footwear, and the avoidance of activities that involve bearing weight.

Keywords: Surgical treatment, Stress fracture, Avascular Necrosis, Sesamoid bone

Introduction

The etymology of the term "sesamoid" can be traced back to its Greek origin, specifically derived from the word "sesamen," which pertains to the seeds of the Sesamum indicum plant. The term "sesamoid" was initially employed around the 16th century. In ancient Greece, the seeds of this particular plant were regarded for their diuretic and purgative effects. The nomenclature of these bones is attributed to their striking resemblance to sesame seeds, which therefore led to their widely recognised common

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designation. Until approximately two millennia ago,[1] individuals held the notion that following mortality, the soul embarked on a journey to the sesamoids. This concept was maintained for a significant duration. The aforementioned facets are situated at the superior aspect of the cranium of the initial metatarsal bone. The aforementioned bones possess their respective points of attachment within the aforementioned tendons, while the bones themselves are embedded within these tendons. When comparing the two, it can be observed that the fibular sesamoid typically measures between 10 and 12 millimetres, whereas the tibial sesamoid has a size range of 12 to 15 millimetres. This connection involves both the sesamoid processes and the second metatarsophalangeal joint.

The two sesamoids are securely interconnected through the considerable intersesamoid ligament, and they are also connected to the base of the proximal phalange through the sesamoid-phalangeal ligament. Both of these ligaments are situated on the proximal phalanx. Furthermore, the retention of their position is facilitated by the deep transverse intermetatarsal ligament, resulting in their anatomical interlocking with the second metatarsal.[2,3] The plantar aspect of the metatarsal head comprises two parallel joint grooves that are divided by a bony ridge. This configuration forms the plantar aspect of the metatarsal head. The grooves, which are lined with articular cartilage and govern the range of motion of the sesamoid bones, are situated on the metatarsal head and can be discerned based on their specific placement. The metatarsal head exhibits grooves that have been sculpted on its surface. The aforementioned phenomenon takes place when the tendon of the long flexor of the hallux traverses the interstice between the sesamoid bones.

Sesamoids are frequently observed in imaging examinations as asymptomatic and fortuitous discoveries. However, it is important not to disregard sesamoids as potential sources of discomfort solely based on their presence. In addition to safeguarding the metatarsophalangeal joint and the tendons of the long flexors of the hallux, these structures also contribute to joint stability and pressure absorption, hence mitigating the risk of attrition. Furthermore, these ligaments serve to protect the tendons of the long flexors of the hallux. This is achieved through elevation of the first metatarsal head and redistribution of weight-bearing onto the lateral aspect of the forefoot. This enables the hallux to fulfil a dynamic function within the foot. This is achieved by the execution of the fulcrum's function, leading to an augmentation in the mechanical resistance of the tendons during the stride impulse phase. Furthermore, these structures also serve the purpose of acting as a fulcrum, so enhancing the mechanical resistance of the tendons. Despite the significant role that sesamoid bones play in the mechanics of the forefoot, symptoms stemming from pathological anomalies in these bones are frequently overlooked or inadequately acknowledged and managed. Notwithstanding the fact that these bones frequently serve as the origin of pain in the forefoot.

The posterior tibial artery is the primary blood vessel responsible for providing blood circulation to these little bones. The utilisation of the posterior tibial artery facilitates the achievement of this objective. It appears that the blood arteries originating from the peripheral soft tissues do not penetrate the cortex of the sesamoid bones, despite their considerable abundance. Consequently, the vascular supply to the sesamoid bones may potentially originate from two to three separate sources. The arteries have a unidirectional course from their proximal origins towards the lateral and medial sesamoid bones, afterwards extending distally through an interconnected system of branches. The arteries can afterwards access the sesamoid bones. The arteries penetrate the non-articular surfaces of the sesamoid bones via the plantar projection, so establishing an additional means of vascular supply. The occurrence of the plantar projection might be attributed to the extension of the plantar plate. In summary, the medial and lateral capsular adnexa are responsible for the vascularization of the sesamoid bones.[4-6]

Metatarsal discomfort can arise due to a range of reasons, encompassing disorders affecting the sesamoid bone. Nevertheless, because to the intricate architecture of the region and the abundance of pain-sensitive tissues, the differential diagnosis of sesamoid bone disorders can pose a considerable challenge. This phenomenon is especially evident when considering the many aetiologies of sesamoid bone issues, which encompass congenital factors, traumatic injuries, arthritic disorders, viral infections, and ischemic events. There is a likely correlation between the displacement of the sesamoids and the occurrence of metatarsalgia, callus formation, and stress fractures.[2] Renander[7] was among the early authors who brought awareness to avascular necrosis of the sesamoid, a disorder that was very unfamiliar at that time. He was among the initial authors to engage in such practises, thus establishing himself as a trailblazer in the respective domain. This clinical phenomena is considered to be exceptionally rare, as it manifests in a minuscule proportion of cases, and lacks a precise diagnostic criterion. As a result of this, there is a potential for erroneous diagnosis and prolonged treatment.

Material and Methods

A group of twenty individuals who exhibited clinical indications of avascular necrosis of the sesamoids had a dynamic assessment of blood circulation using a high-resolution gamma chamber equipped with a rectangular double detector. The present study was conducted to ascertain the presence or absence of the condition in the patients. The examination was conducted with both frontal and lateral projections of the patient's area of interest. Following the administration of 30 mCi of 99mTc-MDP, a series of consecutive photographs were promptly captured for a duration of one minute. Subsequently, static images were obtained once equilibrium had been achieved. This action was undertaken subsequent to the production of the sequential photographs. Imaging equipment was

employed to capture comprehensive images of the entire body in anterior and posterior projections subsequent to the intravenous administration of the radiopharmaceutical for a duration of three hours. Following the administration of the radiopharmaceutical, a series of photos were captured, along with targeted static images of the regions of interest in their late-stage.

Results

The age range of the patients in the study spanned from 18 to 51 years, with a mean age of 30.5 years. The sample consisted of 20 patients, of which 16 (80%) were female and 4 (20%) were male. Out of the total sample size of 20 patients, 8 individuals, accounting for 40% of the participants, exhibited a pathological state in their right foot. Conversely, 12 patients, constituting 60% of the cohort, displayed a pathological condition in their left foot (refer to Table 1 and Figure 1). Each participant displayed the sensation of discomfort in the affected forefoot, and further analysis revealed that three individuals, constituting 15% of the sample, also demonstrated localised edoema and rubor. In the study sample, 12 patients (constituting 60% of the sample) exhibited undivided sesamoids. Additionally, 6 patients (representing 30% of the sample) had bipartite tibial sesamoids, while 2 patients (representing 10% of the sample) exhibited bipartition of both the tibial and fibular sesamoids. These findings are shown in Table 2 and visually depicted in Figure 2.

Table 1. Basic profile of the patients

Gender	Number	Percentage	P value
Male	16	80	0.22
Female	4	20	
Age			0.37
below 20	2	10	
20-30	5	25	
30-40	7	35	
40-50	4	20	
Above 50	2	10	
Mean age	30.52±3.69		
Education			0.18
School level	6	30	
Graduate	12	60	
post graduate	2	10	
Co morbidity			0.25
Hypertension	4	20	
Diabetic	7	35	
Cardiac Problem	3	15	
Others	5	25	
Inadequate footwear	20	100	
Contraceptive used by female	2	50	

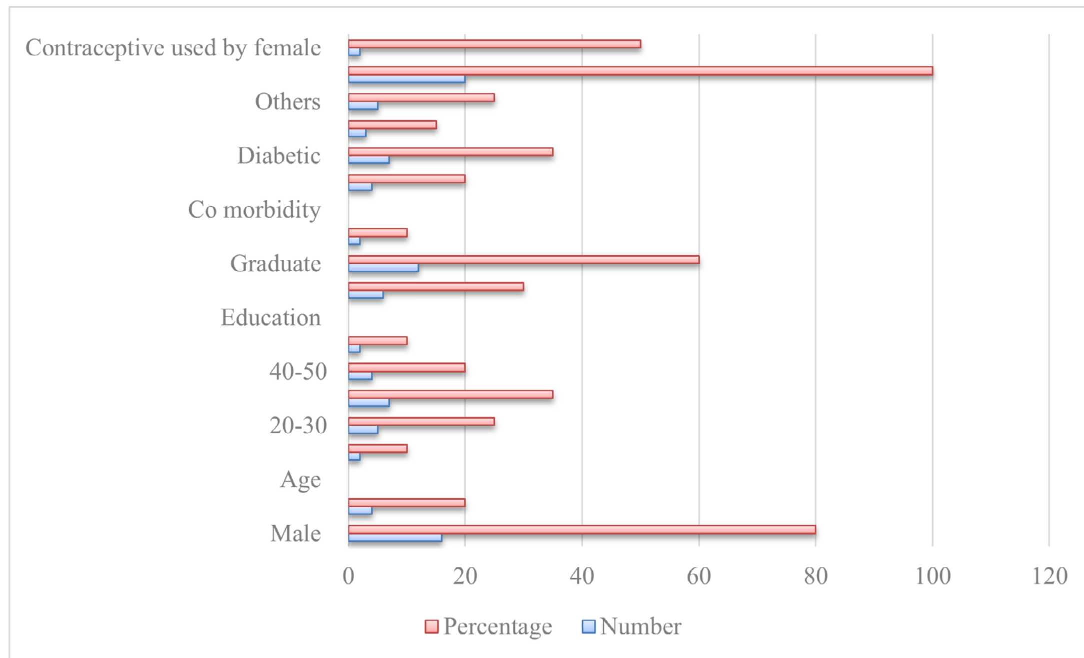

Figure 1. Basic profile of the patients

Table 2. Pathological condition and symptoms

Pathological condition	Number	Percentage	P value
Right leg	8	40	0.03
Left leg	12	60	
Symptom			0.04
Pain	20	100	
localized edema	3	15	
Rubor	3	15	

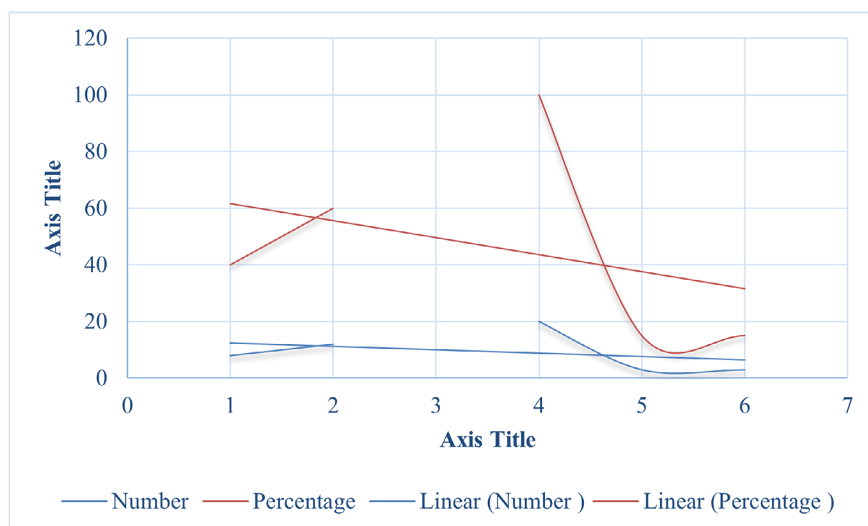

Figure 2. Pathological condition and symptoms

In a sample of patients, it was observed that the tibial sesamoid was affected in 11 individuals, accounting for 55% of the cases, while the fibular sesamoid was influenced in 9 people, representing 45% of the cases. It was determined that every patient was wearing footwear that was ill-suited for their individual foot characteristics, and/or the patients self-reported experiencing traumatic incidents, with or without accompanying fractures. Out of the whole patient population, five individuals were engaged in dancing activities, whereas one participant reported involvement in football. Out of the total number of female patients, specifically two individuals or fifty percent, were found to be utilising some form of contraceptive method, as seen in Table 3 and Figure 3. The diagnosis in all patients necessitated the utilisation of multiple diagnostic methods, including triphasic bone scintigraphy, to ensure accurate identification. In each case, the initial phase of treatment involved providing female patients with guidance to abstain from wearing high-heeled shoes, discontinuing contraceptive use if applicable, opting for suitable footwear, suggesting the use of retrocapital support insoles, prescribing non-steroidal anti-inflammatory drugs, and recommending physiotherapy.

Table 3. Sesamoids

Types of sesamoids	Number	Percentage	P value
Undivided	12	60	0.11
Bipartite tibial	6	30	
bipartition of the tibial and fibular	2	10	0.37
Sesamoid affected			
Tibial	11	55	
Fibular	9	45	

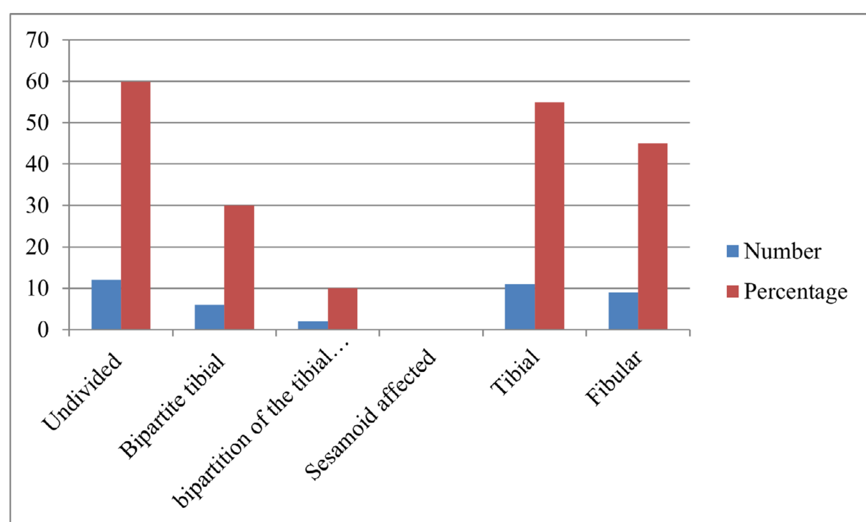

Figure 3. Sesamoids Types

In 60% of the cases, specifically 12 patients, the symptoms did not exhibit any remission. Consequently, surgical excision of the necrotized sesamoid tissue was deemed necessary in these circumstances. In three of the patients, the presence of discomfort, edoema, and localised paresthesia were apparent, ultimately resulting in a mild

form of claudication. As a component of the patient's conservative therapeutic approach for this condition, non-steroidal anti-inflammatory medication was prescribed, and the patient also engaged in physiotherapy sessions. The efficacy of the administered medicine was observed to be universally significant, as all patients experienced a complete resolution of their symptoms subsequent to its administration. Furthermore, no additional anomalies were observed in the anterior part of the foot. The lack of any abnormalities in the forefoot of the specimen indicates this.

It has been a period of approximately 20 to 30 months since the previous follow-up. All participants reported a significant reduction in preoperative discomfort, with near-complete resolution. Moreover, they regained the ability to ambulate without difficulty and even initiated running activities postoperatively. Throughout the duration of the follow-up, the clinical assessment did not reveal any indications of hallux valgus or varus. All patients successfully achieved a dorsiflexion of the first metatarsophalangeal joint (MTP1) to an angle of 45 degrees, without reporting any pain. Additionally, there was no tenderness upon palpation. The strength of the observed subject was found to be comparable to that of the unaffected MTP1 on the contralateral side. Based on the findings of the radiological assessment, it was seen that there was no significant change in the angle between the metatarsals, and no evidence of osteoarthritis was detected in the first metatarsophalangeal joint (MTP1). No radiologic changes were observed in either the tibial sesamoid or the remaining fibular sesamoid, as indicated in Table 4 and Figure 4.

Table 4. Treatment and follow up period of the patients

Treatment	Number	Percentage	P value
Surgical	20	100	0.25
Non surgical	0	0	
Follow up (months)			0.41
20	10	50	
30	10	50	
Hospital stay days			0.22
below 5	4	20	
5-7	10	50	
7-10	6	30	

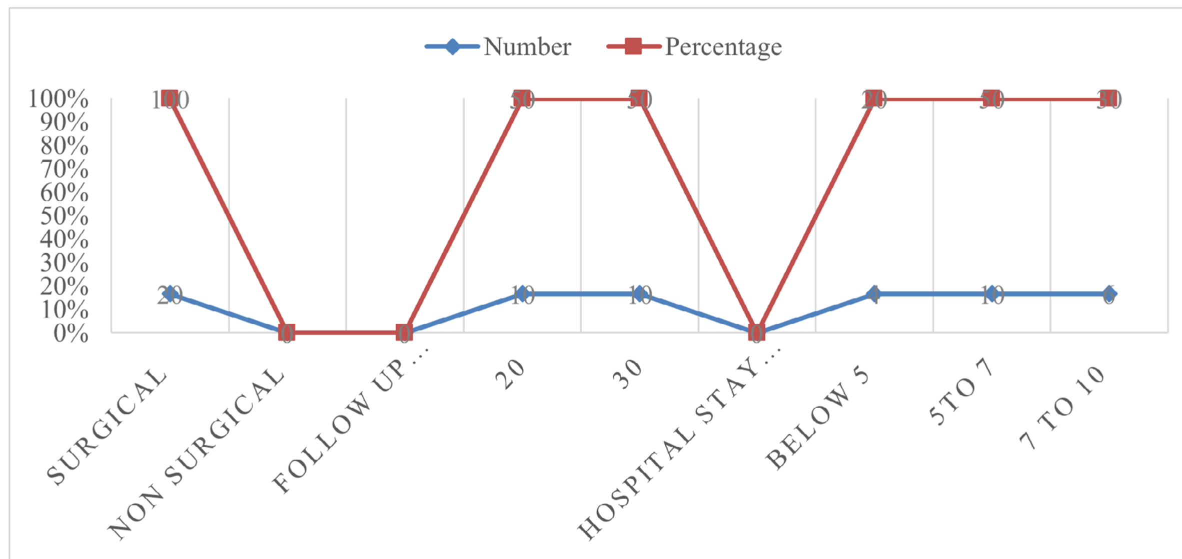

Figure 4. Treatment and follow up period of the patient

Surgical intervention was deemed necessary for patients who experienced persistent and intense pain that remained unresponsive to conservative treatment methods such as anti-inflammatory medications, orthotic devices, and non-weightbearing approaches. In such circumstances, a tourniquet and general anaesthetic were employed. A plantar incision was performed between the first and second metatarsals, commencing 1 cm distal to the metatarsophalangeal joint, as seen in Figure 5. In the axial view (specifically the Walter-Muller view), evidence of fragmentation in the fibular sesamoid and the presence of heterogenous sclerosis, extending 4 cm proximally and located exactly lateral to the common digital nerve, may be observed. By laterally retracting the neurovascular bundle, we were able to successfully identify the fibular sesamoid. Subsequently, a longitudinal incision was performed on the intersesamoid ligament, followed by medial retraction of the flexor hallucis longus tendon. A

meticulous debridement procedure was conducted on the necrotic segment of the fibular sesamoid subsequent to its release from the flexor hallucis brevis tendon connection. The residual tendon cuff, intersemoid ligament, and capsule were repaired with absorbable sutures. During the initial two-week postoperative period, patients were permitted to apply a maximum load of 20 kilogrammes to their operated leg, prior to commencing full weight bearing. No complications were observed over the course of the operation (Figure 5-8).

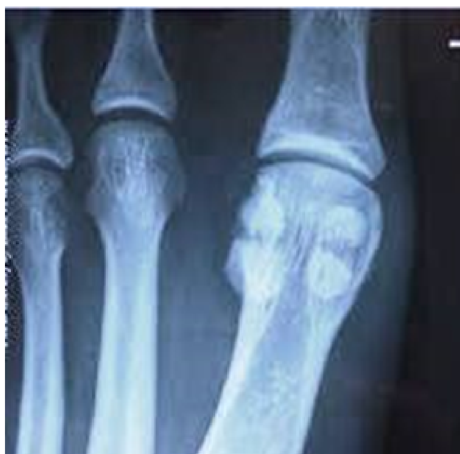
Figure 5. SICK sesamoids

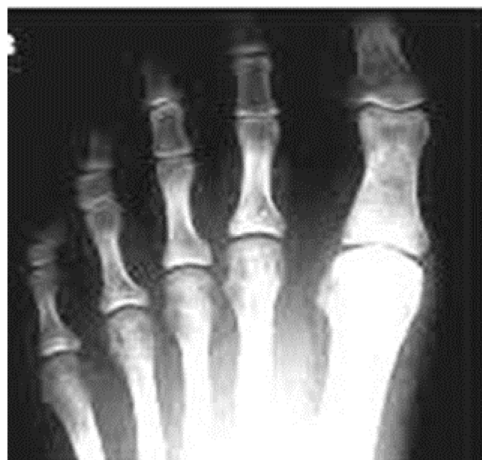
Figure 6. AVN of fibular sesamoids

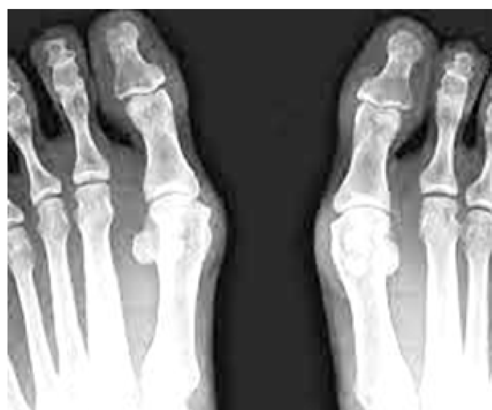
Figure 7. Foot and Ankle High-Risk Injuries

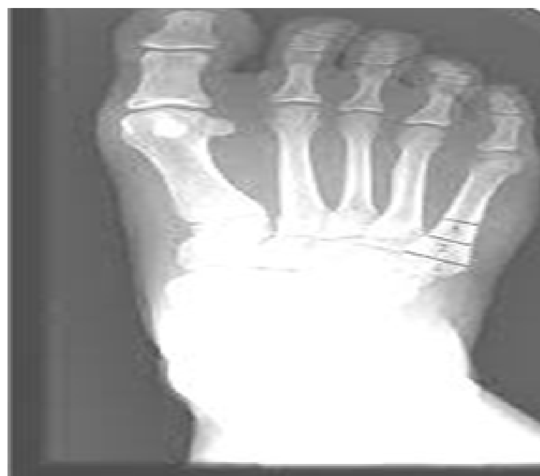
Figure 8. Foot and Ankle High-Risk Injuries

Discussion

Both metatarsal sesamoid bones are consistently present, and they reach complete ossification between the ages of nine and fourteen years.[8,9] Both of these skeletal structures are consistently found. The occurrence of the lateral sesamoid[1,10] in females[10] tends to manifest at a younger age. In approximately one third of individuals, the process of ossification, which initiates from several bone centres, might result in the partitioning of the sesamoid bone.[1,8,9] This phenomenon is most frequently observed in the paediatric population. Consequently, the sesamoids play a crucial function in attenuating impact forces and facilitating a gentle gait that spans from the heel to the distal phalanges. Furthermore, these structures serve to protect the metatarsophalangeal joint and the tendons of the long and short flexors of the hallux. Additionally, they contribute to the enhancement of muscular strength during the impulsion phase of the gait cycle.

With respect to the pathophysiology of osteonecrosis, research has identified anomalies in the vascular supply to the accessory centre of the sesamoid or fragility of the ossification centres. Osteonecrosis has been associated with both of these variables. Repetitive damage to the tendons and serous membranes of the sesamoid-phalangeal apparatus can lead to many diseases, including ischaemia and osteonecrosis. Both of these illnesses have the potential to result in mortality. A disruption in the integrity of the sesamoid bone can potentially give rise to analogous pathological conditions. The most prevalent aetiologies of this condition include microtrauma, certain sports activities like athletics and dancing, and alignment abnormalities of the posterior foot, such as pescavus or pes valgus.[2,8]

The frequency of osteonecrosis of the sesamoid bones remains uncertain, and there is a potential for a higher rate of misdiagnosis associated with this condition. Females are more frequently affected by the illness compared to males, with the majority of individuals affected being either teens or young adults.[2,8] The tibial sesamoid is more prone to developing this condition because to the increased pressures it experiences.[1,3,6,10] While it is possible for

both sesamoids to be injured, the tibial sesamoid is more susceptible to injury. This pronation results in the sesamoid being positioned more prominently. The occurrence of this condition is observed with greater frequency in the tibial sesamoid as compared to the fibular sesamoid, as supported by previous studies.[1-3] Additionally, there is a higher prevalence of this condition among women in comparison to men, as reported in the literature.[11] Moreover, it has been observed that the fracture threshold for bipartite sesamoid bones is lower compared to that of undivided sesamoids, as indicated by previous studies.[1,3,9] All of these factors necessitate careful deliberation. Pretterklieber *et al.*[12] made an observation about the circulation of blood, revealing that the tibial sesamoid receives blood supply from a solitary vessel in 64% of females and 43% of males. This phenomenon was demonstrated by conducting a comparison between genders. According to the data, 57% of females and 50% of males possess a solitary vessel responsible for supplying blood to the fibular sesamoid. Nevertheless, it is observed that females exhibit a higher likelihood of possessing this anatomical feature. This assertion is applicable to individuals of both genders. This phenomenon could perhaps elucidate the higher prevalence of avascular necrosis in female populations and specifically in the tibial sesamoids. The sesamoids located in the left foot were seen to possess a more condensed and diminutive structure in comparison to their corresponding counterparts in the right foot. Additionally, it was observed that the size of men's sesamoids tends to be greater in comparison to those of women. This finding was uncovered during an investigation pertaining to the vascularization of the sesamoid bones in the human foot. Additionally, they provided evidence indicating that the blood supply to the sesamoids in the left foot is greater compared to their counterparts in the right foot. Furthermore, it was observed that the blood flow to the sesamoids in men is higher than that in women. Ultimately, it was demonstrated that the blood supply to the sesamoid bones in the right foot is comparatively lower in comparison to their counterparts in the left foot. The aforementioned investigations have provided an elucidation for the notable variations in size observed among the sesamoids present in the different assemblages.

The primary manifestation is a gradual mechanical discomfort that arises and presents itself on the plantar surface of the first metatarsal head. This discomfort becomes evident upon palpation of the area, application of weight on the hallux, and during the terminal phase of the gait cycle. Exerting excessive dorsiflexion stress on the hallux until it reaches a state of incapacitation exacerbates the problem. Research has demonstrated that antalgic supination of the forefoot is observed during the act of walking.[2-4,8,10] The utilisation of bone scintigraphy is crucial in facilitating an early diagnosis, as it has been observed that abnormalities detected using bone scintigraphy may precede those identified on radiographs. During the initial stages of necrosis, distinct patterns of radiopharmaceutical uptake can be observed, characterised by regions exhibiting significantly elevated uptake as well as regions displaying notably reduced uptake of the radiopharmaceutical.[1,3,8,10,13]

The primary objective of this treatment strategy is to mitigate or eradicate the pain that is commonly associated with the illness. It is conceivable that the administration of non-steroidal anti-inflammatory drugs, in conjunction with a short-term immobilisation, may be necessary.[1] There exists a discourse surrounding the utilisation of intra-articular glucocorticoid injections.[2] In the event that the discomfort persists for a duration beyond six months and fails to exhibit improvement following the suggested conservative therapeutic measures, the potential course of action may involve considering a partial or complete sesamoidectomy, accompanied by the excision of the necrotic region. The dorsal technique is preferred in order to minimise the occurrence of unsightly scars or the development of keloids in weight-bearing areas. There are two primary justifications for this action. Surgeons must exercise cautionary measures to safeguard the integrity of the neurovascular bundle while manipulating the intrinsic tendons and ligaments during relocation procedures. Comprehending the pathophysiological mechanisms of avascular necrosis necessitates a comprehensive understanding of the anatomical aspects pertaining to the trajectory and dissemination of the vasculature. Orthopedists are required to possess knowledge regarding the appropriate utilisation of surgical approaches in order to ensure their proficiency in this area. Maintaining the stability of the metatarsophalangeal joint necessitates the proper maintenance of both the contralateral sesamoid bone and the adjacent fibrous tissue.[8] Following a comprehensive excision procedure of either the fibular sesamoid or the tibial sesamoid, patients may occasionally experience the development of hallux varus or hallux valgus.[2,4] This condition may be accompanied with pain in the sesamoid on the opposite side, and in some instances, a second sesamoidectomy may be required.[4,8] Individuals who have undergone bilateral sesamoidectomy may experience plantar discomfort in the first metatarsal or a deformity known as the "claw" in the interphalangeal joint. These symptoms arise owing to a weakening of the short flexor of the hallux. Both of these symptoms arise from a deficiency in the short flexor of the hallux. Both of these symptoms are caused by the degeneration of the short flexor of the hallux, which can be remedied with muscle stretching techniques. In the event of the manifestation of these issues, potential options to consider include the use of analgesics and orthoses. Histological examinations typically demonstrate a notable increase in granulation tissue, necrotic trabeculae, reactive mechanisms of bone regeneration occurring in abnormal locations, and the presence of chondroid metaplasia.[3]

In their study, Ogata *et al.*[14] documented the surgical intervention employed to extract the affected sesamoid as a therapeutic approach for four individuals diagnosed with avascular necrosis (AVN) of the lateral sesamoid. The duration of the follow-up period varied between 2 and 12 years. Each and every patient indicated a complete

absence of discomfort. Leventen[15] conducted a study wherein a cohort of 18 patients who experienced pain reduction following sesamoidectomy were included for analysis. As mentioned before, the removal of the tibial sesamoid bone may lead to a higher occurrence of hallux valgus deformities, while the removal of the fibular sesamoid can result in hallux varus. Following the initial McBride procedure, which involved the excision of the fibular sesamoid, Mann *et al.*[16] observed that there was a prevalence of hallux varus amounting to 8%. According to Nayfa *et al.*[17], the intermetatarsal angle demonstrated a 2.2-degree rise subsequent to the tibial sesamoidectomy procedure. No significant change in the intermetatarsal angle was seen when comparing the pre-operative and post-operative examinations of our patients.

There remain numerous understanding gaps pertaining to the development of avascular necrosis (AVN) in sesamoid bones. The occurrence of chronic microtrauma has the potential to induce disturbances in the nourishment of the sesamoid bone, ultimately leading to the development of avascular necrosis (AVN). In a study conducted by Kewenter[9] on cadavers, it was demonstrated that bipartite sesamoids have a lower threshold for fracturing when subjected to stress compared to standard sesamoids. Research has demonstrated that the tibial sesamoid has a higher prevalence of avascular necrosis (AVN) compared to the fibular sesamoid. One potential explanation for this problem could be the inherent pronation of the first metatarsal bone, which results in the tibial sesamoid being positioned more prominently. Pretterklieber[18] made the discovery that there are distinct differences in the blood supply to the tibial and fibular sesamoids, as well as variations in blood supply between males and females. The individual exhibited that the provision of blood can be facilitated through one, two, or three arterial arteries, contingent upon the circumstances.

Surgical intervention has promise in the alleviation of symptoms for patients who have poor response to nonoperative therapeutic approaches. It is imperative to provide the patient with counselling regarding the potential development of a hallux valgus or varus deformity as a consequence of the surgical intervention. The probable mechanical dysfunction of the flexor hallucis brevis muscle tendon unit might be attributed to the shortening of the flexor moment arm of the flexor hallucis brevis muscle at the MTP1 as a result of a full sesamoidectomy. Aper *et al.*[19] conducted a cadaver investigation and observed that the effective tendon moment arm of the flexor hallucis longus tendon exhibits a more pronounced drop as the angles of extension increase following the removal of the fibular sesamoid compared to the removal of the tibial sesamoid. This finding was demonstrated despite the fact that both surgeries involved the excision of sesamoids from the tibia. The observed phenomenon could potentially be attributed to structural differences between the lateral and medial sesamoid sulci. The incline of the lateral sulcus is greater in comparison to the medial sulcus. The extension of the toe, which is a consequence of the removal of the fibular sesamoid, results in the upward displacement of the flexor hallucis tendon along the incline. This displacement puts the tendon into closer proximity to the central axis of joint rotation. This phenomenon results in a decrease in the moment arm of the tendon. The removal of both sesamoids can lead to the development of clawtoe due to the disturbance it causes to the plantar flexion force exerted by the flexor hallucis brevis muscle.

The plantar approach to the fibular sesamoid is preferred due to its high level of accessibility. On the contrary, a dorsal strategy presents itself as a viable alternate approach that could be employed. The utilisation of plantar incisions presents a notable benefit in terms of reduced distance required to reach the sesamoid. Nevertheless, it is crucial to acknowledge the heightened potential for harm to the neurovascular bundle and the flexor hallucis longus tendon when applying this particular surgical approach. Due to the close closeness to the digital nerves in relation to the sesamoids, it is not advisable to perform an incision directly over the sesamoids. It is advisable to refrain from doing a more lateral excision due to the potential impact on the musculus adductor hallucis, which may ultimately lead to the development of a hallux varus deformity. It is recommended to perform a reparative procedure involving the drilling of a hole in the distal phalanx in situations where the tendon has been detached from its point of attachment. It is probable that individuals with a hereditary predisposition for hypertrophic scarring may experience decreased post-operative morbidity as a result of employing the dorsal technique.

Conclusions

The existing body of data provides support for the notion that early non-surgical intervention should be undertaken in cases of avascular necrosis of the sesamoid. The recommended therapeutic approach would encompass the utilisation of anti-inflammatory medications, the utilisation of suitable footwear, and the avoidance of activities that involve bearing weight. When the condition has endured for a duration beyond six months, surgical intervention should be contemplated as a viable therapeutic alternative. A bone exhibiting three sides. The utilisation of scintigraphy plays a crucial role in both the diagnosis and treatment of avascular necrosis of the sesamoid. The significance of scintigraphic examinations has been growing due to its valuable contribution in facilitating early and accurate diagnoses of complex illnesses affecting the sesamoid bone. This task often poses challenges for individuals with expertise in the field. Scintigraphy is an indispensable diagnostic technique that plays a crucial role in guiding physicians in selecting appropriate therapies. Its utilisation helps prevent the persistence of detrimental dysfunctions that can have long-lasting effects and significantly impact the patient's social and occupational functioning.

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