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Fabella bone with relative clinical syndrome implications: A comprehensive literature review

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Abstract
The fabella is a sesamoid bone, meaning 'little bean' in Latin, which ranges from 10 to 30 mm in size. Located posterior to the knee joint, its existence is rare and considered an anatomical variation, although its roots and functions remain unclear. Recently, however, there has been increasing evidence suggesting that the fabella is becoming more familiar in Asia and South Africa, particularly in certain populations. Its existence is associated with significant knee pain syndromes, and it may fracture, causing pain. The fabella can categorically cause knee osteoarthritis, especially in cases of uncommon conditions accompanied by pathology and anatomical variations. It is highly recommended that surgeons be alerted to the fabella and keenly assess, examine, and manage any cause of knee pain or injury. This review aims to address this knowledge gap."

Keywords: Fabella, Sesamoid Bone, Anatomical Variation, Pain Syndrome

Introduction and Detailed Information

Fabella is among the sesamoid bone simply found at posterolateral knee corner, mainly embedded to gastrocnemius tendons, and it articulates with the lateral femoral condyle [2, 3], it's said to have no apparent function, nevertheless is assumed to support friction and stabilize the medial femoral condyle [4], likely attaches to other peri knee structures forming fabella complex; arcuate ligaments, fabellofibular, fabellopopliteal, oblique popliteal ligaments, plantaris muscles and gastrocnemius [2].
Studies has associated fabella bone with medical conditions such as postero lateral corner pain syndrome, fabella fracture, popliteal artery intrapments, common fibular nerve pain due to increased tension by bone itself or fabella fracture [2, 5].

Anatomic consideration & variations of fabella bone.

Considerably the fabella is like a bean shaped mass can be of cartilaginous, or bony or ligaments, estimate range from 10-30mm its size vary from one to another [2, 6].
Nicole *et al* [4], conducted a study on Chinese and Japanese individuals, findings showed fabella was located at gastrocnemius muscle tendons and possibly along fibula ligament; fabella fibular ligament (FFL).Though from the same study, to central European individual findings result was negligible, given that facts, anatomic variation and location of these sesamoid bone is of great challenge in making accurate diagnosis and treatments,
Egerci and his collique (2017) [7] recruited Turkish subjects retrospectively, where bilateral knee imaging was done,500 patients, 250/250 male and female subjects respectively, making total of 1000 knee radiography, considering variation between sesamoid bone at particular location(anatomic location), side, sex and gender was analysed, findings showed increased fabella bone significantly to bilateral side 76(15.2%), unilateral knee side was 38(7.6%), likewise as per this study fabella prevalence was similar to age and gender. Therefore, study results underscore the importance of physicians consider fabella bone presence regardless of sex and age.
Besides Nicole Helene Hauser *et al.* [4] analysed fabella characteristics, biomechanics, histological nature, fabella occurrence and position, from their analysis it was found that 30% of fabella situated at proximal part of posterolateral femoral condyle, Histologically it was found lack of articular cartilage but with conspicuously fabello fibular ligaments (FFL), similarly fabella seemed as a stabilizer of posterolateral knee joint tissues such as meniscus, thus basing on this fact, the need to consider fabella involvement at any knee structural component pathology is valid. Fig; (1a&b; shows normal fabella position and location). Unlike these findings, Kawashima *et al* [8] found fabella cartilage and bony present in 66% out of 150 gastrocnemius heads

involved in their study. Variations of these anatomical study evidences; provides a special look for fabella bone that could bring challenges in making diagnosis, treatment and outcome.

Fig 1a: Showing radiological picture of a normal fabella at the posterolateral femoral condyle, By Duk-Seop Shin, MD, *et al*. Korean Orthopedic Association; 2017.

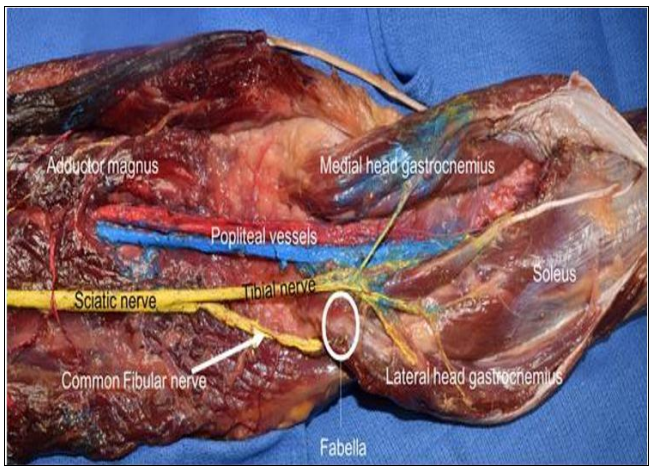

Fig 1b: Shows the location of fabella to gastrocnemius heads and surrounding structures; -By Dalip D, Iwanaga J, Oskouian R J, *et al*. (June 05, 2018) A Comprehensive Review of The Fabella Bone.

The effects of Fabella to posterolateral corner pain associations;

Not surprisingly fabella presence has been associated to cause peri knee pain especially at upper lateral side, Fabella pain syndrome, as tenderness is felt over the posterior part of lateral femoral condyle, though the syndrome is sometimes identified uncommon [5, 9] Dunnawi Z *et al* demonstrated symptomatic knee pain from two patients secondary to fabella presence, whereas both patients were treated arthroscopically resecting fabella, 12-month post resection, both patients reported no pain. Meanwhile muller *et al* [10] found that to a 18 year female who presented at their department with complex knee injury, radiographs did not pick fabella bone, several years after conservative treatment yet presented with knee pain, this time when imaging was taken showed evidence of fabella. Thus, these findings open the possibility of fabella bone whenever there is knee injury presentation.

However, in cross sectional study involved 562 patients with knee injury and persistent pain, (between 2015-2017) by Popts with collique [11] reported no significant difference association to prevalence incidence of fabella with posterolateral pain. Probably these conflicting findings to above studies, could explain the challenges to fabella bone to orthopaedic surgeon concerning diagnosis and treatment of peri articular or intra articular knee pain complex. Therefore, understanding the presence of fabella with its complication and anatomical variations could be of critical importance in terms of treatment and outcomes.

Fabella fracture

Fracture of the fabella is uncommon incident when occurs becomes a source of knee posterolateral corner pain and may remain undiagnosed clinically and in imaging modes because its limited prevalence [10] in 1932 fracture incidence was firstly reported by sagel [12], however there an increasing evidence of the fracture though rare to occur mainly caused by direct knee injury or prolonged mechanical knee stress. Imaging technic is the best option upon detection [Fig 2].

Radiographic Pictures of Fabella Fracture.

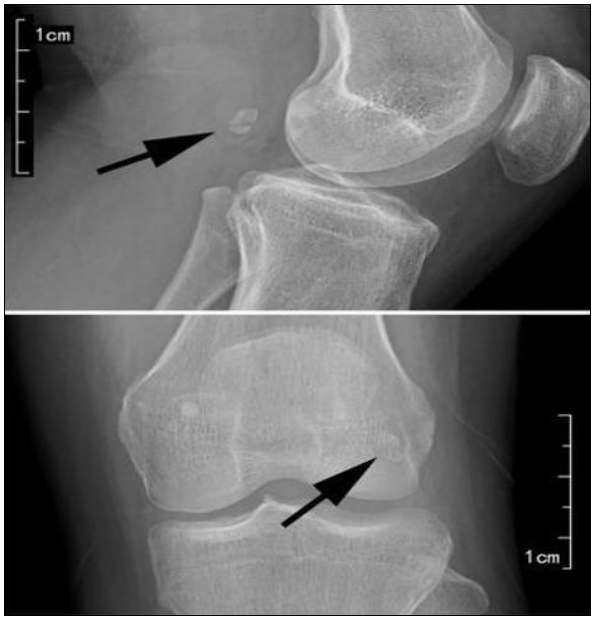

Fig 2: Radiological imaging showing the fractured fabella (black arrows); Image by Feng Zhou *et al*- A case report study

Post Total Knee Arthroplasty (TKA) pain Fabella induced,

Fabella is exceptionally associated to induce knee pain after TKA, if factors causing pain after prosthetic positioning remain abscent, fabella is aforementioned, Okono *et al*, identified 5 case reports of knee pain after TKA, 3 cases out of 5 patients, developed knee pain due to fabella presence, when radiographs examination done confirmed presence of fabella bone at lateral condyle of fermur,Concequently post TKA knee pain is markedly reported depending on the bigger size of fabella more than 1cm,exceptionally anatomic location at gastrocnemius heads, incorrect placing the prosthesis components which may cause the fabella part just rubbing or contact to lateral tibia femoral part and/or soft tissues to cause unnecessary compression or impingement [1], based on this fact it is worth imperative to surgeons to exclude fabella pain after TKA, yet ruling out fabella presence prior and/or post-surgery.

Association of fabella bone to fibular nerve Compression syndrome.

Though there is limited literatures that fabella is the cause of peroneal nerve/fibular neuropathy, by far this exists [13]. Yamoto *et al* [14] evaluated that 20.8% of peroneal/fibular nerves take their course to fabella and likely to cause neuropathy during knee flexion or hyperextension. [15] Tikebe and his collique also reviewed a case of fibular nerve entrapment in popliteal space which prompted with the compression syndromes; loss of sensations to peri knee area, gait disturbance and foot dropping.

Fabella with popliteal artery entrapment syndrome.

Popliteal artery entrapment syndrome(PAES),fabella presence has been relatively associated to cause popliteal compression; Ando *et al* [16]. in this case patient presents with severe knee pain and interminted claudication [17], CT angiography is used to diagnose vascular occlusion, fabelloctomy with popliteal artery repair could be the best optional treatment [18].

However, uncommonly fabella presence is also mentioned not unconnected to knee osteoarthritis(OA);Clark & Methew [19]. Furthermore, Urata *et al* [2015], the interaction of fermoral part with fabella may pronounce fabella femoral OA [20].

Treatment

Managements of fabella pathologies are very challenging due to its anatomical variations and atypical distributions to individuals. Understanding fabella anatomy and its possible complications is of critical role to surgeons. Treatments considerations includes physical therapy, local injections of anethetics or steroids admistration and shock wave therapy in case of fabella pain syndrome, if pain persists surgically is done(fabellectomy) [21, 22].

Conclusion

Several evidences have demonstrated presence of fabella in human anatomy with structural variation and distribution and/or related clinical pathology, though its apparent functions still uncertain., Nevertheless can be overlooked during diagnosis and treatments outcome. Orthopaedic surgeons should be aware to rule out fabella whenever encounters patients with knee pain either pre or post-surgical approaches. However, there is a need of level 1 RCT which could shed a light for a better understanding of fabella anatomical variation, presence and distribution.

Conflicting interests:

There is no obvious conflict of interest.

References

1. E Okano *et al.* Fabella Syndrome as an Uncommon Cause of Posterolateral Knee Pain after Total Knee Arthroplasty: A Case Report and Review of the Literature. Case Rep. Orthop, 2016, p4328462.
2. Dalip D, Iwanaga J, Oskouian RJ, Tubbs RS. A Comprehensive Review of the Fabella Bone, Cureus. 2018; 10(6):e2736.
3. Phukubye P, Oyedele O. The incidence and structure of the fabella in a South African cadaver sample. Clin. Anat. N. Y. N. 2011; 24(1):84-90.
4. Hauser NH, Hoechel S, Toranelli M, Klaws J, Müller-Gerbl M. Functional and Structural Details about the Fabella: What the Important Stabilizer Looks Like in the Central European Population, BioMed Res. Int, 2015, p343728.
5. Driessen *et al.* The fabella syndrome - a rare cause of posterolateral knee pain: A review of the literature and two case reports, BMC Musculoskelet. Disord. 2014; 15:100.
6. Howale DDS, Patel DZK. Hypothesis: Morphology & Development of Patella. 2013; 3(5):p5.
7. Egerci OF, Kose O, Turan A, Kilicaslan OF, Sekerci R, Keles-Celik N. Prevalence and distribution of the fabella: A radiographic study in Turkish subjects, Folia Morphol. 2017; 76(3):478-483.
8. Kawashima T, Takeishi H, Yoshitomi S, Ito M, Sasaki H. Anatomical study of the fabella, fabellar complex and its clinical implications, Surg. Radiol. Anat. SRA. 2007; 29(8):611-616.
9. Dannawi Z, Khanduja V, Vemulapalli KK, Zammit J, El-Zebdeh M. Arthroscopic excision of the fabella, J. Knee Surg. 2007; 20(4):299-301.
10. Cherrad T, Louaste J, Bousbaä H, Amhajji L, Khaled R. Fracture of the Fabella: An Uncommon Injury in Knee, Case Rep. Orthop, 2015, p396710.
11. Pop TS, Pop AM, Olah P, Trâmbiţaş C. Prevalence of the fabella and its association with pain in the posterolateral corner of the knee: A crosssectional study in a Romanian population, Medicine (Baltimore). 2018; 97(47):e13333.
12. Sagel J. Fracture of sesamoid bones. Am. J. Surg. 1932; 18(3):507-509.
13. Décard BF, Nagy S, Garcia M, Fuhr P. An unusual case of bilateral peroneal palsies due to fabellae, Neurology. 2017; 88(9):p918, 28.
14. Yamahiro K, Case of fibular nerve paralysis possibly caused by the fabella, Seikeigeka Orthop. Surg. 1967; 18(2):145-150.
15. Takebe K, Hirohata K. Peroneal nerve palsy due to fabella, Arch. Orthop. Trauma. Surg. Arch. Orthopadische Unf.-Chir. 1981; 99(2):91-95.
16. Ando Y, *et al*. A case report on a very rare variant of popliteal artery entrapment syndrome due to an enlarged fabella associated with severe knee osteoarthritis, J. Orthop. Sci. Off. J. Jpn. Orthop. Assoc. 2017; 22(1):164-168.
17. Agathangelidis F, Vampertzis T, Gkouliopoulou E, Papastergiou S. Symptomatic enlarged fabella, BMJ Case Rep, 2016.
18. Cesmebasi A, Spinner RJ, Smith J, Bannar SM, Finnoff JT. Role of Sonography in the Diagnosis and Treatment of Common Peroneal Neuropathy Secondary to Fabellae, J. Ultrasound Med. Off. J. Am. Inst. Ultrasound Med. 2016; 35(2):441-447.
19. Clarke AM, Matthews JG. Osteoarthritis of the fabella: a fourth knee compartment?, J. R. Coll. Surg. Edinb. 1991; 36(1):p58.
20. Urata Y, Okamoto S, Nakamura E, *et al.* A case of fabello-femoral osteoarthritis (fabella OA) with locking-like symptoms. Orthop Traumatol. 2015; 64:644-647. Google Search." [Online]. Available: https://www.google.com/search?q=Urata+Y%2C+Okamoto+S%2C+Nakamura+E%2C+et+al.+(2015)+A+case+of+fabellofemoral+osteoarthritis+(fabella+OA)+with+lockinglike+symptoms.+Orthop+Traumatol

+64%2C+644%E2%80%93647.&oq=Urata+Y%2C+Okamoto+S%2C+Nakamura+E%2C+et+al.+(2015)+A+case+of+f abello-femoral+osteoarthritis+(fabella+OA)+with+lockinglike+symptoms.+Orthop+Traumatol+64%2C+644%E2%80%93647.&aqs=chrome..69i57&sourceid=chrome&ie=UTF-8. [Accessed: 21-Jun-2019].

21. Seol P-H, Ha KW, Kim YH, Kwak H-J, Park S-W, Ryu B-J. Effect of Radial Extracorporeal Shock Wave Therapy in Patients With Fabella Syndrome, Ann. Rehabil. Med. 2016; 40(6):1124-1128.
22. Zipple JT, Hammer RL, Loubert PV, Treatment of fabella syndrome with manual therapy: A case report. J. Orthop. Sports Phys. Ther. 2003; 33(1):33-39.