Research Journal of Medical Sciences 7 (1): 25-27, 2013
ISSN: 1815-9346

Prevalence and Types of Accessory Ossicles and Sesamoid Bones of the Feet of Adult Southern Nigerians

A.I. Udoaka and B.C. Didia
Department of Anatomy, University of Port Harcourt, Rivers State, Nigeria

Abstract: The prevalence and types of sesamoid bones in the feet of adult Southern Nigerians was studied. Most accessory ossicles and sesamoid bones of the ankle and feet remain asymptomatic but can cause painful symptoms and as a result there has been an increase interest in their study. Sesamoids are small rounded masses of bony tissue embedded in certain tendons and ligaments usually related to joint surfaces. A total of 520 normal radiographs of adult Southern Nigerians 314 males and 206 females were utilized in the region. The result showed 81% of the total population with two sesamoids bones at the metatarsophalangeal joint of the hallux others were 10% Os perineum, 2.5% Os trigonum, 0.5% of Os vesalianum and 0.3% Os tibiale extrernum. Only 5% of the population did not have any sesamoid bones. This study presents the variability of the sesamoid bones in the feet of the Southern Nigerians.

Key words: Sesamoids, Os vesalianum, Os perineum, metatarsophalangeal, hallux, Os trigonum

INTRODUCTION

Sesamoids occur in the substance of tendons and maybe completely or partially ossified and are usually related to joint surfaces (Anwar *et al*., 2005). The sesamoids of the first metatarsophalangeal joint are the most important and constant sesamoids of the foot. They affect the tendon of the flexor hallucis longus under the first metatarsal head and helps to increase the fulcrum of the intrinsic musculature to provide a stronger planter flexion force at the first metatarsophalangeal joint (Anwar *et al*., 2005).

The accessory sesamoid bones are developmental anomalies that may occur as subdivisions of normal bones or a separate prominence of an ordinary tarsal bone. They are as follows:

Os trigonum: It is an oval or round bone seen between the posterior tibial malleolus and the calcaneal tuberority.

Os tibiale externum: There are well defined rounded or oval bones near the medical side of the navicular bone. The ossification centre is inside the tibialis proterior tendon. There are 3 types, differentiated in their sizes and exact location around the navicular bone. They are prone to injury (Sella *et al*., 2004; Lawson *et al*., 1984).

Os vesalianum: This is an accessory bone that is located peoximal to the base of the 5th metatarsal. It is found within the peroneus brains tendon.

Os supratalare: This lies in the upper borders of the navicular bone. It is triangular in shape and the tibialis posterior tendon inserts on it.

Os perineum: This is located within the substance of the distal peroneums longus tendon near the cuboid. Others are Hallux digital accessory sesamoids, Os inter-metatarsum and inter-phalayeal accessory sesamoids. Most accessory ossicles and sesamoid bones of the feet remain asymptomatic however, they have increasingly been studied because they can cause painful syndromes or degenerative changes in response to trauma or increase flexion (Brigido *et al*., 2005; Bureau *et al*., 2000).

The prevalence and ossification of sesamoid bones in the feet have been studied in several populations using radiographs. In all the studies differing percentages of occurrence of the sesamoid and accessory sesamoid bones have been recorded. Msamati and Igbigbi (2001) noted that all the subjects (100%) examined in adult Malawians exhibited two sesamoids at the metatarsophalangeal joint of the hallux. This was not the case in the Turkish population were 83.2% showed two sesamoids (Kiter *et al*., 2006). In the Japanese subjects it was 90.9% (Masaki, 1984). In the study by Goldberg and Nathan (1987) it was (100%) all the subjects in the Japanese that had the sesamoid bones at the 1st metatarsophalangeals joint.

Other accessory sesamoid bone occurrence have also been studied by other researchers, the accessory

Corresponding Author: A.I. Udoaka, Department of Anatomy, University of Port Harcourt, Rivers State, Nigeria

navicular sesamoid (Os tibiale externum) has been found out to be the most common type accounting for 11% in recent study by Coskun *et al.* (2009) amongst the Turkish people the hallucal sesamoid bones in the interphalayeal joint shows occurrence of 3.1% in an Arab population studied by Dharap *et al.* (2007). This was quite different compared to approximately 13% seen in a study by Davis *et al.* (2003).

In all these there is indeed a great disparity in descriptions occurrences and possible situation of the sesamoid bones, this was the conclusion of the study by Jacobs (1974) and it still stands till date.

The clinical importance of the sesamoid bone is due to the great deal of fore foot pain that arises from damage due to trauma and sport (Biedert and Hintermann, 2003; Bureau *et al.*, 2000). And muscular dysfunction has also been associated with the sesamoids (Peacock *et al.*, 1988; Brigido *et al.*, 2005).

MATERIALS AND METHODS

A total of 520 radiographs of 314 males and 206 females were used for this study. The radiographs were of standard quality and were of the right foot in both lateral and anterior proterior views of the same foot were viewed. They retrieved from the radiology departments of the following hospitals in Nigeria, there were the University of Port Harcourt Teaching Hospital, Port Harcourt, University of Uyo Teaching Hospital, Uyo, Braithwaite Memorial Specialist Hospital, Port Harcourt and the University of Calabar Teaching Hospital, Calabar.

The number of the sesamoid bones and the location of the accessory sesamoid bones to determine the type was noted. Simple percentages from the frequency was the statistical analysis done.

RESULTS AND DISCUSSION

The results 1st metatarsophalangeal joint (1st MTPG) sesamoids were the most prevalent accounting for a total of 424 or 81.54% in the general population.

Percentage occurrence in both females and males were similar. The least occurring were were Os tibiale externum and Os vesalianum each accounting for <1% in both gender.

About 5% of the total number (16 males and 10 females) of the studied population did not show any form of sesamoid in their radiographs shows in Table 1.

This study was conducted to ascertain the prevalence of sesamoid bones and accessory sesamoid bones in the feet of Nigerians using radiographs. The result obtained showed that the sesamoid of the 1st metatarsophalangeal joint pf the toe was the most common accounting for about 83% in males and 79% in females (81.5% of the total population). This value is quite close to an earlier study done on the Turkish subjects (Kiter *et al.*, 2006). They had a value of 83.2%. A higher percentage of 90.9% was seen amongst the Japanese (Masaki, 1984) however, Goldberg and Nathan (1987) recorded 100% for the Japanese. In Africa, the only study done by Msamati and Igbigbi (2001) recorded that all the subjects (100%) had two 1st metatarsophalangeal joint sesamoid bones in contrast to the study where 5% of the population did not have sesamoid bones in their feet of the accessory sesamoid bones, the most prevalent in the study was that of the Os peroneum (about 10%) but the Os tibiale externum (11%) was found to be the most prevalent in the Turkish population (Coskun *et al.*, 2009).

This study also recorded the following other accessory sesamoid bones in very small percentages-Os trigonium (2.5%), Os tibiale externum (0.58%) and Os vesalianum (0.4%). The Os Supratalare, Os intermetatarsum the interphalangeal accessory sesamoids were not seen.

The hallucal sesamoid bones of the interphalangeal joints which was seen by other reseachers with an occurrence of 3.1% in the Arab population (Dharap *et al.*, 2007) and 13% seen by Davis *et al.* (2003) surprisingly was not seen by us. Also not seen were other interphalangeal accessory sesamoid bones recorded to various percentages in the Turkish population.

Table 1: The frequency, percentages and types of sesamoid bones/ accessory sesamoid bones in relation to gender of subjects and in total population

	Males		Females		Total population	
Types of sesamoid bones/accessory sesamoid bones	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
The 1st metatarso-phalangeal joint sesamoid (two in no)	261	83.12	163	79.13	424	81.54
Os trigonium	6	1.91	7	3.40	13	2.50
Os perneum	30	9.55	22	10.68	52	10.00
Os tibiale externum	1	0.32	2	0.97	3	0.58
Os vesalianum	-		2	0.97	2	0.38
None	16	5.10	10	4.85	26	5.00
Total	314	100.00	206	100.00	520	100.00

The Malawian people of Africa Msamati and Igbibi recorded a 10% of sesamoid bones seen at the metatarsophalangeal joint of the 5th toe. This was also not seen in the study population.

CONCLUSION

This study has shown that the most common types of sesamoid bones among adult Nigerians is the sesamoid of the 1st metatarsophalangeal joint of the big toe which accounted for about 81.5% of the total study population. The other sesamoid seen were in very small percentages 5% of the population did not show sesamoid bones in their feet. The prevalence was compared to other study groups and the variations noted.

REFERENCES

Anwar, R., S.N. Anjun and J.E. Nichol, 2005. Sesamoids of the foot. Curr. Orthopaedics, 19: 40-48.

Biedert, R. and B. Hintermann, 2003. Stress fractures of the medical great toe sesamoids in athletes. Foot Ankle Int., 24: 137-141.

Brigido, M.K., D.P. Fessel, J.A. Jacobson, D.S. Widman, J.G. Craig, D.A. Jamadar and M.T. van Holsbeeck, 2005. Radiography and U S of Os perineum fractures and associated peroneal tendon injuries: Initial experience. Radiology, 237: 237-241.

Bureau, N.J., E. Cardinal, R. Hobden and B. Aubin, 2000. Posterior ankle impingement syndrome: MR imaging findings in seven patients. Radiology, 215: 497-503.

Coskun, N., M. Yuksel, M. Cevener, R.Y. Arican and H. Ozdemir *et al*., 2009. Incidence of accessory ossicles and sesamoid bones in the feet: A radiographic study of the Turkish subjects. Surg. Radiol. Anat, 31: 19-24.

Davis, M.B., K. Abdislam and R.J. Gibson, 2003. Interphalangeal Sesamoid bones of the great toe: An anatomic variant demanding careful scrutiny of radiographs. Clin. Anatomy, 16: 520-521.

Dharap, A.S., H. Al-Hashimi, S. Kassabs and M.F. Abu-Hijleh, 2007. Incidence and Ossification of Sesamoid bones in the hands and feet: A radiographic study in an Arab population. Clin. Anatomy, 20: 416-423.

Goldberg, I. and H. Nathan, 1987. Anatomy and pathology of the sesamoid bones. The hand compared to the foot. Int. Orthopaedics, 11: 141-147.

Jacobs, P., 1974. Great disparity in discriptions of possible situations off the Sesamoid bones. Multiple Sesamoid bones of the hand and feet. Clin. Radiol., 25: 267-271.

Kiter, E., S. Akkaya, B.A. Kilic and F. Demrkan, 2006. Distribution of the metatarsophalangeal Sesamoids in Turkish subjects. J. Am. Podiatr Med. Assoc., 96: 437-441.

Lawson, J.P., J.A. Ogden, E. Sella and K.W. Barwick, 1984. The Painful accessory navicular bone. Skeletal Radiol., 12: 250-262.

Masaki, T., 1984. An anatomical study of the interphalangeal sesamoid bone of the hallux. Nihon Seikeigeka Gakkai Zasshi., 58: 419-427.

Msamati, B.C. and P.S. Igbigbi, 2001. Radiographic appreance of Sesamoid bones in the hands and feet of Malawian subjects. Clin. Anat, 14: 248-253.

Peacock, K.C., E.J. Regnick and J.J. Thoder, 1988. Fractures of the Os perineum with rupture of the pereoneus longus tendon. A case report and review of litreture. Clin. Orthop Relat Res., 202: 223-226.

Sella, E.J., J.P. Lawson and J.A. Ogden, 1986. The accessory navicular synchrondrosis. Clin. Orthop Relat Res., 209: 280-285.