Correction to the *Metacarpale I* of the Amud Man A New Description Especially on the Insertion Area of the *M. opponens pollicis*

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Abstract The first metacarpal bones of the Amud man, a Neanderthal man found in West Asia in 1961, was described by the present author in 1970. In that paper, he was mistaken the bone in regard to its side. The corrected new description on the first metacarpals of the Amud man was given in this paper.

The author reexamined the differences between the right and left first metacarpals on the recent and prehistoric bones. The radial impression for the *M. opponens pollicis* develops well to become a flange on the Amud bone. This characteristic can not only be seen in the Neanderthal man but is also seen in the muscular prehistoric people.

INTRODUCTION

The hand skeleton of the Amud man, a Neanderthal man found in West Asia in 1961, was described by the present author (ENEO and KIMURA, 1970) in the book "The Amud Man and His Cave Site". There is a nearly complete first metacarpal bone and a crushed bone fragment which looks like the first metacarpal. The crushed bone fragment was in so bad a condition of preservation that it will not be discussed any further in this paper. The present author described the nearly complete bone as the left bone. Dr. VLČEK of the National Museum in Praha, Czechoslovakia, pointed out in 1975 that the bone is not the left one but the right one in his personal letter to Dr. SUZUKI, the editor of "The Amud Man and His Cave Site". The present author examined the first

metacarpal bone for the differences in the characteristics of the side. Then he re-examined the bone of the Amud man and found out that he had been mistaken in his previous paper. This error was made only on the part the present author was responsible for. He would like to correct the description of the hand skeleton of the Amud man, especially the insertion area of the *M. opponens pollicis* which is developed quite well in the Amud man.

DIFFERENCES BETWEEN THE RIGHT AND LEFT IN THE *METACARPALE I*

The differences between the right and left in the first metacarpal bone were examined on 22 recent Indians preserved in the Department of Anatomy, Teikyo University School of Medicine, on 33 recent Japanese in the Medical Section of the University Museum, University of Tokyo,

and on 151 sides of the Jomon man (prehistoric Japanese) in the Anthropological Section of the University Museum, University of Tokyo. Observations were made on five hands of the recent Japanese bodies in the Department of Anatomy, Teikyo University.

The proximal articular surface of the bone "is divided by a low ridge running antero-posteriorly, and the larger subdivision is" always radial (FRAZER, 1965, p.96). The width of the ulnar subdivision is about eighty percent of that of the radial one. The dorsal and palmar edges of the articular surface were pointed on the more ulnar side than the ridge on the central part of the surface. The articular surface ends more distally on the radial side.

Three muscles insert on the first metacarpal, *M. opponens pollicis*, *M. abductor pollicis longus* and *M. interosseus dorsalis*. The *M. interosseus palmaris* is said to appear sometimes on the ulnar side of the shaft. On the radial margin of the proximal end of the shaft, there is a tubercle on the proximal side of which the long abductor pollicis inserts. Around ten to twenty percent of the tubercles are as small as the edge on the ulnar margin for the ligament. The opponens pollicis muscle inserts on the radial margin of the shaft. The distal half of the shaft develops to be a ridge or a flange and the proximal half is concaved to be an impression. The insertion area of the dorsal interosseous muscle develops to be a ridge or a line on the ulnar margin of the distal half of the bone, being lesser than that

of the opponens pollicis and never developing to be a flange. The thin line sometimes appear only on the proximal side of the shaft, such a kind of line never appearing on the radial margin. The proximal concaved impression on the dorsal side is usually weaker in this muscle than that in the opponens pollicis. A clear ridge for the palmar edge of the dorsal interosseus sometimes appears on the proximal end of the shaft. The palmar edge for the opponens pollicis is weak if it appears.

The radial margin of the distal articular surface is more proximally situated than the ulnar margin is. In the metacarpals and finger phalanges of the hand, the articular surface prolongs usually more proximally on the further side of the bone from the third digit. On the palmar side, the articular surface shows usually two bony prominences. The ulnar prominence prolongs more proximally and the radial one prolongs more palmarly. Only three bones, out of 241 sides of bones examined, are the exception to this radial prolongation.

CORRECTION TO THE DESCRIPTION OF THE *METACARPALE I* OF THE AMUD MAN

The left margin of the first metacarpal bone of the Amud man, seen from the dorsal view and with the distal end pointing towards the top (Plate), must be the radial margin from the characteristics stated below: a large subdivision of the proximal articular surface which develops distally; a small but clear tubercle near

the proximal end of the shaft; and a large flange on the distal two-thirds of the shaft. A part of the distal articular surface is lacking so it is difficult to use to decide the side of the bone. The bone is the right one.

The right and the left must be inverted in the description of the *Metacarpale I* in the previous paper "Postcranial skeleton of the Amud man" (ENDO and KIMURA, 1970). In addition to changing the "left" to the "right" in regard to the *Metacarpale I* in Fig. X-16, Tables X-17 and X-18 and Plates 46(X-8) and 47(X-9), the description on pages 276, 280 and 387 must be changed as stated below.

p.276. All paragraphs under "*Metacarpale I*"

We have the right *Metacarpale I* which lacks only the dorsoradial corner of the distal end. It is as long as that of Skhul IV. The height at the mid-point of the shaft is rather small. The index of robusticity, the least circumference divided by the maximum length, is larger than that of the Tabun female and smaller than that of the Skhul males.

MCCOWN and KEITH (1939, p.155) mentioned that "a wide distal end is a Neanderthal character but it is not of diagnostic significance". The breadth at the distal end in Amud I is as large as that in the other Neanderthal man in absolute value, but not so large in relative value as shown by the head index. There may be three bony processes on the dorsal side of the distal end. The tubercles for ligaments on the distal end do not develop as

those of Tabun I. The proximal end is as large as that of the other Neanderthal man. The dorso-palmar concavity on the proximal articular surface is very weak. But there is no convexity which can be seen in the La Chapelle (BOULE, 1911-13) or in the Kiik-Koba (ULLRICH, 1958) bones. Two muscular invasions on the dorsal surface of the proximal shaft are not so strong as those of Tabun I, being larger than those of Skhul V when compared with the figures given by MCCOWN and KEITH (1939, Fig. 109). The radial margin develops strongly and rolls up to the palmar side, especially on its distal half. This is the insertion area of the *M. opponens pollicis*. Because of this, the transverse diameter is large compared with the dorso-palmar diameter, as shown in Fig. X-16 and Table X-18. MCCOWN and KEITH (1939) mentioned about the ruggedness of the outline in the bones of Tabun I and Skhul V (p.155). SARASIN (1932) mentioned about this development as the remarkable characteristics in the European Neanderthal man, though he declared that this sometimes appears also in the modern man. The vent of the shaft in the dorso-palmar direction is small.

We have a fragment of the distal end which looks like that of the left *Metacarpale I*. This fragment is so crushed that it is difficult to study it further in detail.

p.280. First paragraph under "Discussion"

The insertion areas of the flexor and abductor muscles, such as the *Os pisiforme*, *Hamulus ossis hamati* and *Tuber-*

culum ossis scaphoidei, are developed in the Amud hand skeleton. The insertion area of the *M. opponens digiti minimi* on the *Metacarpale V* and of the *M. opponens pollicis* on the *Metacarpale I* are developed. The other muscle impressions on the metacarpals are not marked. The development of the insertion area of the *M. opponens pollicis* was reported by SARASIN (1932) in the Neanderthal man. The muscles related to the grip, such as the flexor muscles of the forearm and the opponens muscles of the hand, seem to be developed well in the Amud man. Considering the largeness, especially the articular part of the fingers and the distal tuberositas, this hand is capable of both precision grip and strong power grip. The long fingers with relatively slender shafts of the metacarpals are not convenient for power grip to some degree, but it will be convenient for precise manipulation. The flat proximal phalanges can also be said to be not a convenient character for power grip.

p. 387. Third paragraph under "Upper limb"

As to the muscle for the hand movement, such muscles as the *M. flexor carpi ulnaris*, *M. opponens digiti minimi*, *M. flexor digiti minimi brevis* and *M. opponens pollicis* may be well developed in Amud I. This muscular development is deduced from the development of the *Os pisiforme*, *Hamulus ossis hamati*, radial margin of the *Metacarpale I* and ulnar margin of the *Metacarpale V*. The former three are also developed among the Mount Carmel

people, but the *Metacarpale V* is less developed. Curiously, the left *M. adductor pollicis* in the Amud I seems to be poorly developed whereas the right muscle seems normal. SARASIN (1932) stated that the radial margin of the *Metacarpale I*, which is the insertion area of the *M. opponens pollicis*, is well developed in the European Neanderthals. This is also seen in Amud I, as already mentioned above.

THE INSERTION AREA OF THE *M. OPPONENS POLLICIS*

The radial margin of the first metacarpal of the Amud man develops very well to become a flange on the distal two-thirds, as shown in Plate. This is the insertion area of the *M. opponens pollicis*. The insertion area ends at the proximal end of the shaft as a slightly concaved impression. This insertion area is well developed compared with the other prehistoric and recent people described below.

SARASIN (1932) examined the bones of La Chapelle and La Ferrassie I and II and declared that the radial development is the remarkable characteristics of the Neanderthal man. He mentioned that this sometimes also appears in the modern man and that the gorilla shows this characteristic. MUSGRAVE (1971) examined many Neanderthal, European Upper Palaeolithic, Mesolithic and modern hand bones. He said that a flange on the radial margin of the shaft is a very noticeable feature of the Neanderthal man. According to him, BONCH-OSMOLOVSKII (1941) also mentioned about this.

BOULE (1911-13) did not describe this

in his paper on La Chapelle nor on La Ferrassies. The photographs (Pl. VIII-Fig. 4) by him shows that on the first metacarpal of the male La Chapelle the development forms a ridge on the distal half and the slight ridge continues to the proximal half. The left metacarpal of the male La Ferrassie I has a large developed flange on the radial margin, as seen from the photograph (DAY, 1965, Fig. 14).

MCCOWN and KEITH (1939) did not clearly describe this insertion area. But they mentioned about the ruggedness of the outline in the left bone of the female Tabun I and in the right bone of the male Skhul V (p.155). They mentioned about the concaved insertion areas of the opponens pollicis in the proximal half of these bones in their explanation of Fig. 109. This figure and the plate (Pl. XI-C) show that the flange for the opponens muscle develops well in the Tabun I left bone in the distal two-thirds. That of the Skhul V right bone seems to develop considerably but not too much. In regard to the radial margin of the other first metacarpal bones of Mount Carmel man (Skhul IV right and left, Skhul VII left), there is no description nor any figure, so it is impossible now to know the patterns.

The left metacarpal of the male Shanidar IV seems to have a slight development at its distal half of the radial margin, as seen from the photograph by STEWART (1964, Fig. 13).

No first metacarpal has been reported on the erectus phase of man.

A left metacarpal (SK 84) was discov-

ered in the Swartkrans as the bone of the australopithcine phase of man. In this bone a flange for the insertion area of the opponens pollicis develops well in its distal two-thirds, as seen from the figure and photograph (ROBINSON, 1972, Fig. 101 and 102). The proximal end of the shaft shows a slight impression of the muscle. DAY (1965, p.190) mentioned the strong muscular markings on this bone.

The right first metacarpal of the male of the Grotte des Enfants, Grimaldi, shows a somewhat developed ridge or line for the opponens pollicis in the two-thirds of the bone, as seen from the photograph (VERNAUE, 1906, Pl. IX-Fig. 1).

The insertion area of the opponens pollicis of the prehistoric people is usually well developed. The insertion area develops in the Neanderthal man, as SARASIN (1932) and MUSGRAVE (1971) mentioned. This also grows in the man of the australopithcine phase, in the Upper Palaeolithic man and in the Jomon man, the prehistoric food hunter-gatherer in Japan. We can see the well matured flanges on the Jomon people as shown in Plate. Recent Japanese people, especially females, show a poorly developed insertion area. The development of the muscle insertion looks to depend on the age of the specimen. There is a possibility that this characteristic is not a special one of the Neanderthal man but may be the feature of the muscular prehistoric man of the hunter-gatherer.

SUMMARY AND CONCLUSION

The description of the first metacarpals

of the Amud man by the present author was mistaken in regard to its side. The

author reexamined the differences between the right and left first metacarpals. The shapes of the articular surfaces and of the muscle insertion areas were described. The description of the Amud first metacarpal bones was corrected in this paper.

The Amud man has a well developed radial flange for the insertion of the *M. opponens pollicis*. This characteristic can not only be seen in the Neanderthal man but is also seen in the muscular prehisto-

ric pople.

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アムッド人第1中手骨の記載訂正. 特に母指対立筋付着部についての検討

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アムッド人(西アジア地域で1961年に発見されたネアンデルタール人)の手骨の記述および検討は著者によってなされた(ENDO and KIMURA, 1970)。アムッド人にはほとんど完全な第1中手骨が一本発見されている。この骨を著者は左側と記載した。チェコスロバキアの VLČEK 博士は1975年にこの骨が右側であることを指摘した。著者は先の誤りを認め、アムッド人の第1中手骨の記載の訂正をこの文において行う。1970年の論文中の該当箇所はこの文にある通り読み替えられるものとする。

この記載訂正のために、著者は現代インド人、現代日本人および縄文時代人の第1中手骨の観察を行った。これにより左右差の記載を主に関節面と筋付着部の形態から行った。またアムッド人によく発達している母指対立筋の付着部について特に検討を加えた。この筋付着部は SARASIN (1932) によってヨーロッパネアンデルタール人の特徴の一つとされたものである。しかしながら著者はこの筋付着部が他の化石人骨や縄文時代人にもよく発達していることを見た。従って母指対立筋付着部はネアンデルタール人のみに発達しているのではなく、先史時代人一般によく発達しているものといえるのではないかと思われる。