Variations of interdigital flexion creases–inciting the curiosity of the researchers, professionals and the public

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ABSTRACT: Missing or extra digital creases in individuals with or without certain syndromes and/or phenotypic changes are a source of continuous interest for geneticists, researchers and even forensic professionals. Still, with the advent of open access journals and improved accessibility to scientific literature, this topic seems to entice general public as well.

Key Words: *Flexion, Interdigital, Forensic*

Five years ago, we published an article in the International Journal of Anatomical Variations describing a single bilateral interdigital flexion crease of the fifth finger (accompanied with a ring crease) in a phenotypically normal male (1). Active and passive mobility in this individual was not affected, and there were no radiological deviations in the number or shape of the phalanges. Our case report added to the body of literature studying missing or extra interdigital flexion creases–both in phenotypically normal individuals or those with certain syndromes and syndromic traits.

Missing or extra digital creases in people with normal joint anatomy, but also in those with various syndromes point towards the conclusion that genetic determinants ultimately play a role in digital crease formation; nevertheless, the exact contributing factors are still poorly understood, and there is lingering disagreement among researchers regarding the origin of digital creases. One of the two dominant hypotheses takes the stance that creases are a secondary developmental feature as a result of flexion movements in utero, whereas the other one is supporting purely genetic perspective unrelated to fetal palm and finger movement (2).

However, it seems that the both of these factors have a prominent role in crease development, and consequently, variation of interdigital flexion creases. By using reflex movements early in gestation, a research group led by Cathy Stevens from the University of Utah has shown that fetal hand movement is pivotal for the development of crease patterns (3). Conversely, Fried and Mundel described one Ashkenazi Jewish family where the lack of distal interphalangeal creases (combined with limited flexion) was caused by an autosomal dominant gene which was transmitted through four generations, affecting in turn eight individuals (4).

And while nowadays researchers are trying to use different animal models to elucidate this issue, from the clinical perspective this type of crease variation may be important in syndrome identification – most notably those belonging to the RAS signaling pathway [5], but in a plethora of other ones as well (1). Furthermore, it can be used for professional forensic and biometric purposes. When certain crimes are recorded, the face is often hidden, thus hands and fingers (if they are completely discernible) may be a key for solving them.

And indeed, in their recent short report published in the Journal of Forensic and Legal Medicine, Bahadur Singh and his colleagues cited our article when describing extra phalangeal crease as a valuable trait in forensic identification (5,6). They showed a photocase of an extra phalangeal crease in the fifth finger of a 62-year old female, with normal radiological signs, and contrasted this finding with our case description of a missing crease. Their conclusion was that such unique features need to be reported due to their importance in forensic examinations for establishing the identity of either the victim or the assailant (6).

But this topic also seems to bridge academic science with public interest. In the five years following the publication of our original article on single bilateral interdigital flexion crease, we received four e-mails from the people living in Europe and the United States (two male and two female) that were curious about the issue even further, as they had single interdigital flexion creases on the fifth digit of either one or both their hands. None of them had any known developmental or genetic disorders, or any issues with hand and finger motion. It was their curiosity that drove them to further explore the issue on their own; hence it seems that such traits entice the interest of general public as well.

Three of the people who contacted us had single interdigital flexion crease on the right hand, whereas just one of them had a single crease on both hands, confirming much rarer presentation of bilateral interdigital flexion crease of the fifth finger in a phenotypically normal individual. The person with the bilateral single crease was a Caucasian male, 67-years of age, with four siblings, three children and six grandchildren–and none of them presented with the same variation. He mentioned that his mother was a heavy alcohol drinker and a smoker during pregnancy, and had been wondering whether these could be contributing factors, which definitely warrants further research. Two of the other three emailers with a single crease only on the fifth finger of the right hand have also mentioned having children without this variant, albeit one of them was prompted to write because one of her children had autism, thus she wondered if any genetic component might be present.

Although the jury may be out for quite some time before we get the answers to such questions, further research endeavours would undoubtedly be highly beneficial–not only for scientists trying to elucidate whether the egg came before the chicken or vice-versa (in this case does genetics precedes fetal movements in crease formation), or professionals trying to catch offenders who may be unlucky to have an extra or missing crease, but also for the general public used to having answers to their health-related inquiries.

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