

## Case Report

## Bilateral tendon-like formation at the distal edge of the adductor pollicis muscle

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## ABSTRACT

We present a unique description of bilateral tendon-like structures at the distal border of the transverse head of the adductor pollicis leading to a palpable strand in a 48-year-old female. Variations of the adductor pollicis are briefly reviewed.

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## 1. Introduction

Classical textbook descriptions of the adductor pollicis include a transverse and an oblique head with the radial artery passing between both heads and being innervated by the deep branch of the ulnar nerve. The transverse head (also known as adductor transversus pollicis) has a triangular shape and arises from the third (24%) or from the third and fourth metacarpal bone (76%), being occasionally divided into two layers (2%).<sup>1,2</sup> The oblique head also has a variety of origins (capitate, trapezoid, and trapezium)<sup>2</sup> and is composed of three dorsal and two palmar layers of fascicles.<sup>3</sup> Occasionally, atavistic muscle fibres origin from the fifth metacarpal bone, named either transversus manus<sup>4–6</sup> or contrahentes digitorum.<sup>7,8</sup> These fibres are usually present in amphibia and lower mammals but absent in the gorilla and orangutan.<sup>7</sup> In humans, contrahentes digitorum muscles exist in early development but disappear as the embryos grow, assimilated in part in the oblique head of the adductor pollicis.<sup>9,10</sup>

## 2. Case report

A 48-year-old female discovered a palpable strand between the thumb and the index in both hands with no discomfort. She first noticed it about 15 years ago and it hadn't changed since. There was no history of specific manual activity which could explain a mechanic hardening of this particular location. The hand showed

no contractions or other pathological signs. When forming a claw hand the strand was prominent and projected to the distal edge of the transverse head of the adductor pollicis, usually palpable as a soft mass (Fig. 1A).

To further investigate and localize this structure a MRI of the left hand was performed. A 3 T MRI system (Verio, Siemens Medical Solutions, Erlangen, Germany) and a 16-channel torso coil was used for signal acquisition. The MRI examination included T1- and T2-weighted turbo-spin-echo (TSE) images (slice thickness 3 mm). The transverse head of the adductor pollicis arised from the third metacarpal bone and inserted to the proximal phalanx of the thumb including the ulnar sesamoid. At the distal border of the muscle, a dense connective tissue strain could be observed (Fig. 1B–D).

## 3. Discussion

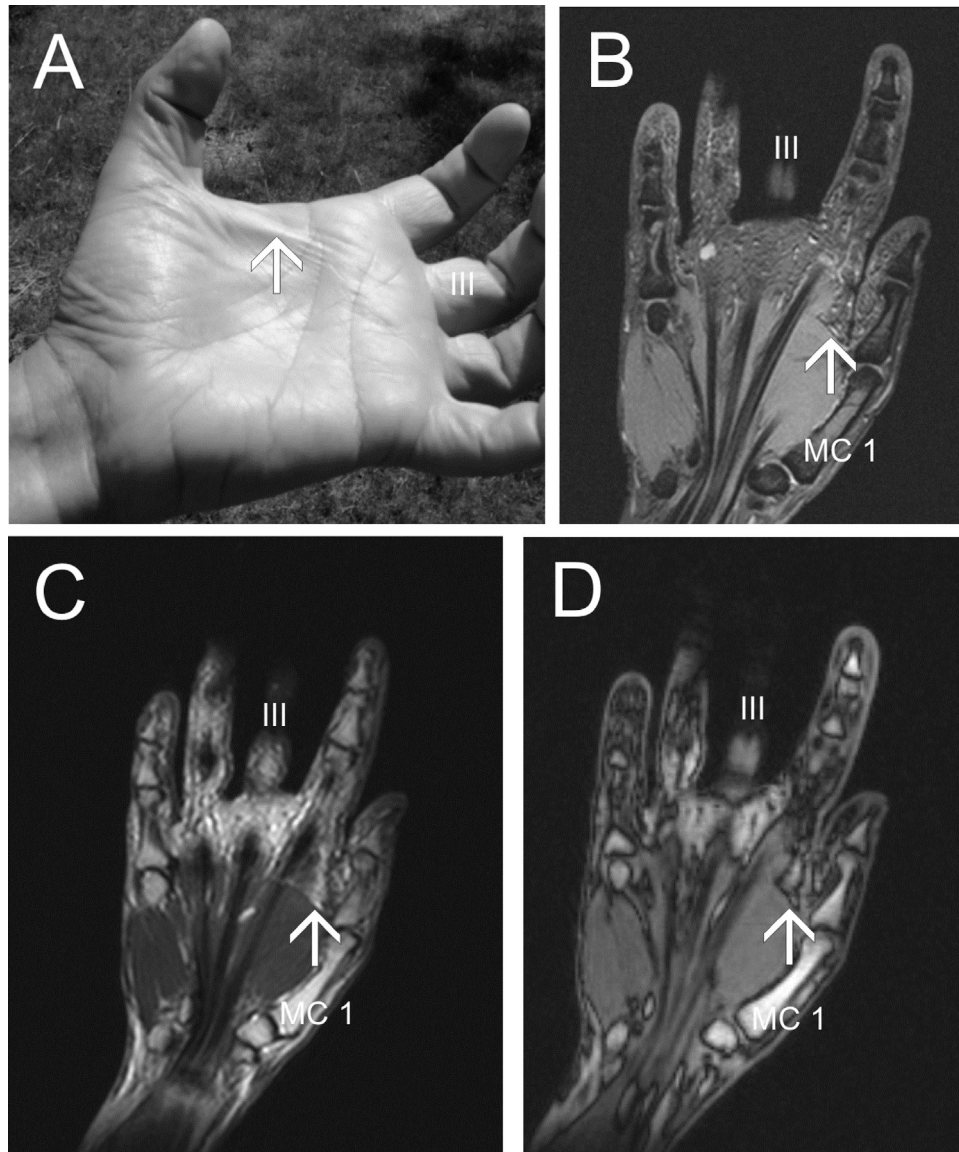
The unique finding of bilateral tendon-like strands along the transverse head of the adductor pollicis raises several questions:

Is the finding a variation or a pathology? All classical diagnoses concerning fibrous thickening and hardening could be ruled out, more specific there were no signs for Dupuytren's contracture (thickening and nodularity of the fascia as an early stage), scleroderma, and other fibromatoses, fasciitis and inflammatory reactions, or degenerative processes. The bilateral appearance and the lack of discomfort also support the structure to be a variation without clinico-pathological relevance and not induced by mechanic exposure.

Do ligaments occur beside muscles? Classical textbooks describe tendon formation at the origin and insertion of the muscle and ligaments as dense connective tissue between bones

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**Fig. 1.** Tendon-like strand (arrow) in the left hand at the distal edge of the adductor pollicis, pars transversus. A. Clinical appearance forming a crawl. B. T1 weighted MRI image. C. High T2 weighted MRI image. D. PD weighted MRI image. III = third phalanx; MC 1 = first metacarpal bone.

and along joints. The muscle itself is surrounded by a soft and homogenous fascia. Strand thickenings of the fascia are not common and have no specific name. At the radial edge of the oblique head of the adductor pollicis, fine ligaments were described as metacarpal ligament of the thumb.<sup>11</sup> It is in close relation to the first interosseous muscle, often neglected in textbooks but present in 85%.<sup>12,13</sup> A fibrous arch is described to occur in about one third of human hands between the two heads of the adductor pollicis, in some cases forming a strong fibrous bundle from the third metacarpal bone to the ulnar sesamoid.<sup>14</sup> It is tempting to speculate that fibrous thickening could also sporadically occur at the distal border of the adductor pollicis and that the tendon-like strand described in this case report is just a highly pronounced example. Some studies in the dissection room might address this question.

In addition to muscular thickening, the distal and proximal commissural ligaments are located superficially in the first web space.<sup>15</sup> The course of the distal ligament (ligament of Grapow) is distinct different from the strands presented in this case, as is the proximal commissural ligament.<sup>16</sup>

Is there a developmental explanation? Cihak described two blastemata layers for the thenar muscles<sup>17</sup>: the superficial layer forming the short abductor pollicis and the deep layer forming the opponens, short flexor, and the interosseous muscles of the thumb. A separate layer serves as anlage for the contrahentes muscles which degenerate as such and form the adductor pollicis.<sup>18</sup> It is therefore not correct to simplify the adductor pollicis as being the first palmar interosseous as a whole.<sup>19</sup> Tendons develop separate and subsequently connect with the muscles.<sup>20</sup> Regarding these developmental aspects there is no direct link to a tendon-like structure along the transverse head of the adductor pollicis.

Could the finding be atavistic in nature? There are no descriptions of tendon-like structures in any of the primate studies concerning the hand. However, some interesting notes were reported by St John Brooks<sup>21</sup>: one is the mentioning of an adductor primi aberrans with insertion into the radial side of the index finger in a human; the other is the description of an abductor indicis in the gibbon. A mentioning of an abductor indicis in the human exists in an old abstract without defined description<sup>22</sup>; Gray is using this term in the human for the first dorsal

interosseous.<sup>23</sup> The gibbon hand has a hyper-mesaxonic position and mainly used for swinging from tree to tree rather than quadrupedalism.<sup>24</sup> It is tempting to speculate that by shortening of the middle hand the abductor indicis might become part of the adductor pollicis and usually degenerate. In rare cases it might be seen as either an adductor primi aberrans as noted by St John Brooks or as a ligament strand as described in the present case report. Further studies on primate hands might address this issue.

### Conflict of interest

The named author hereby declares that he has no conflicts of interest to disclose.

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