**Methods S2.** One subject had additional tracked bones - the talus, navicular and cuboid. The spring ligament, short plantar ligament and the deep fibers of the long plantar ligament were modelled in addition to the plantar fascia. The fibers connected the selected origin and insertion, with the constraint that the fiber cannot pass through any bone [1]. The anterior tuberosity of the calcaneus was connected to the inferior posterior triangular surface of the cuboid by 8 fibers, modelling the short plantar ligament [2]. The protuberance between the anterior and medial tuberosities of the calcaneus was connected to the anterior oblique crest of the tuberosity of the cuboid with 6 fibers for the deep component of the long plantar ligament [2]. Nine fibers connected the calcaneus to the navicular, wrapping around the talus (spring/calcaneonavicular ligament) [2]. Using generated distance fields for each bone, a custom optimization was implemented in MATLAB (Natick, MA, USA).

The lengths of the fibers were measured as the sum of the Euclidean distances between adjacent points (120 points for the plantar fascia, 20 points for all other ligaments). The elongation of the fibers was normalized to the range (max-min) of lengths of each individual ligament in the trial. The normalized elongation was filtered with an adaptive low pass Butterworth filter with a cut-off frequency of ω_1=14 and ω_2= 20 Hz [3]. This filter effectively preserves the high-frequency content during the impact event at initial contact.
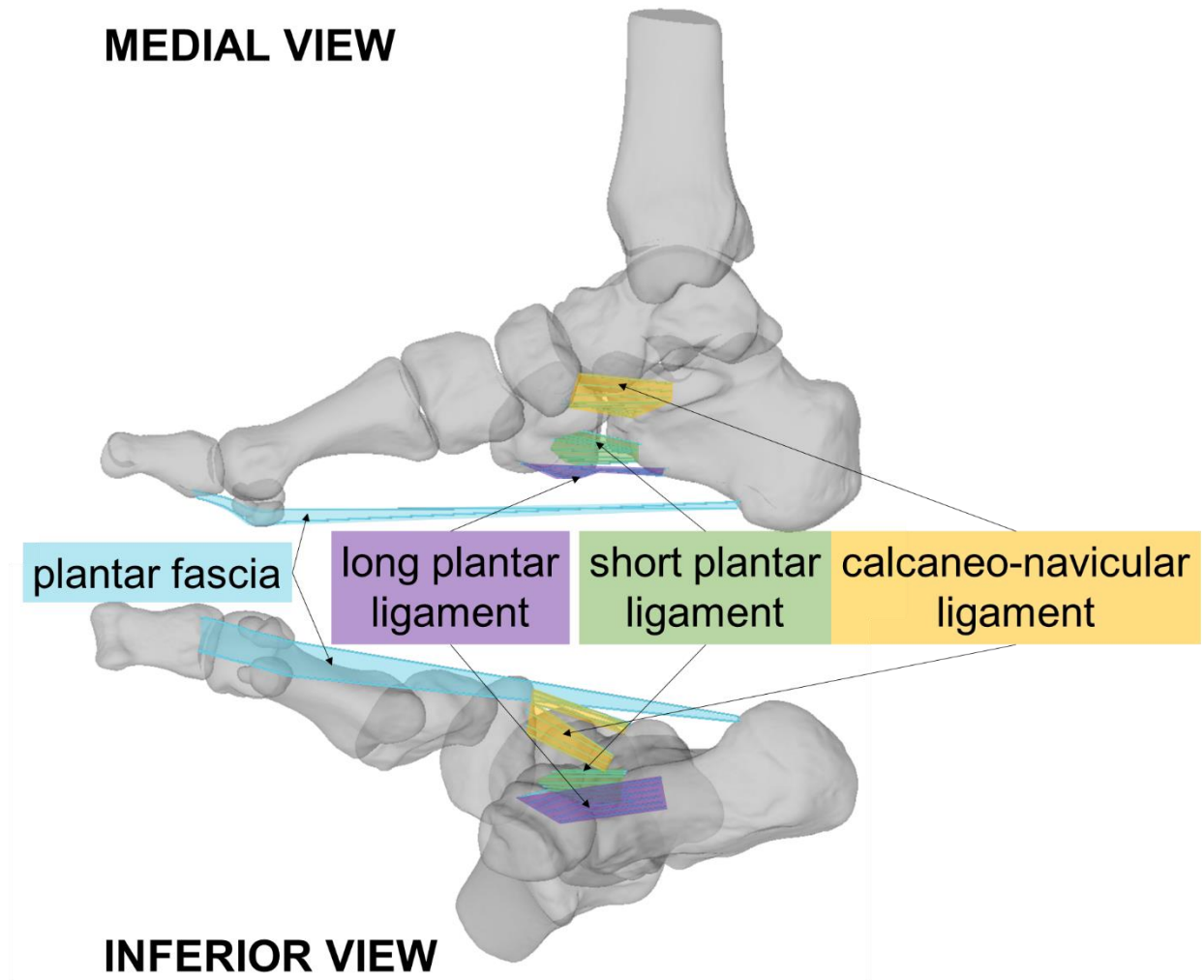
Figure S2. Proximal arch ligaments. Ligaments modelled for the one subject with additional tracked foot bones in a medial and inferior view.

Supplementary information references

1.   Marai GE, Laidlaw DH, Demiralp C, Andrews S, Grimm CM, Crisco JJ. 2004 Estimating joint contact areas and ligament lengths from bone kinematics and surfaces. *IEEE Trans. Biomed. Eng.* **51**, 790–799. (doi:10.1109/TBME.2004.826606)

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